# THE AMERICAN JOURNAL OF PSYCHIATRY

Vol. 98 MARCH, 1942 No. 5



EDITOR

CLARENCE B. FARRAR, M.D.
111 St. George Street, Toronto, Ont.

ASSOCIATE EDITORS

CHARLES MACFIE CAMPBELL, M.D.
WILLIAM RUSH DUNTON, JR., M.D.
FRANKLIN G. EBAUGH, M.D.
THEOPHILE RAPHAEL, M.D.
STANLEY COBB, M.D.
WILLIAM C. SANDY, M.D.
CLARENCE O. CHENEY, M.D.
KARL M. BOWMAN, M.D.
ALVIN T. MATHERS, M.D.
AARON J. ROSANOFF, M.D.
WALTER L. TREADWAY, M.D.
SAMUEL W. HAMILTON, M.D.

FORMER EDITORS

1844–1931

AMARIAH BRIGHAM, M.D.
G. ALDER BLUMER, M.D.
T. ROMEYN BECK, M.D.
RICHARD DEWEY, M.D.
JOHN P. GRAY, M.D.
HENRY M. HURD, M.D.
EDWARD N. BRUSH, M.D.



The American Journal of Psychiatry, formerly the American Journal of Insanity, the official organ of The American Psychiatric Association, was founded in 1844. It is published bi-monthly, the volumes beginning with the July number.

The subscription rates are $6.00 to the volume: Canadian subscriptions, $6.25; foreign subscriptions, $6.50, including postage.



Copyright 1942 by The American Psychiatric Association.



Office of Publication, 1500 Greenmount Ave., Baltimore, Md.

Editorial communications, books for review and exchanges should be addressed to the Editor, Dr. Clarence B. Farrar, 111 St. George Street, Toronto, Ontario, Canada.

Business communications, remittances and subscriptions should be addressed to The American Psychiatric Association, 9 Rockefeller Plaza, New York, N. Y.

Entered as second-class matter July 31, 1911, at the postoffice at Baltimore, Maryland, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917. Authorized on July 3, 1918.

# THE AMERICAN PSYCHIATRIC ASSOCIATION

## OFFICERS

1941–1942

*President,* J. K. HALL, M.D. ..... Richmond, Va.
*President-Elect,* ARTHUR H. RUGGLES, M.D. ..... Providence, R. I.
*Secretary-Treasurer,* WINFRED OVERHOLSER, M.D. ..... Washington, D. C.

## COUNCILLORS

| For three years | For two years | For one year |
|---|---|---|
| GEORGE H. STEVENSON, M.D. | WILLIAM C. SANDY, M.D. | RICHARD H. HUTCHINGS, M.D. |
| ROSCOE W. HALL, M.D. | FREDERICK W. PARSONS, M.D. | LAWRENCE KOLB, M.D. |
| J. D. REICHARD, M.D. | BERNARD T. MCGHIE, M.D. | WILLIAM J. TIFFANY, M.D. |
| KARL MENNINGER, M.D. | LEROY M. A. MAEDER, M.D. | E. ARMITAGE BABER, M.D. |

## AUDITORS

| For three years | For two years | For one year |
|---|---|---|
| CHESTER L. CARLISLE, M.D. | HORACE G. RIPLEY, M.D. | CHARLES W. CASTNER, M.D. |

## EXECUTIVE COMMITTEE

J. K. HALL, M.D. — WINFRED OVERHOLSER, M.D.
ARTHUR H. RUGGLES, M.D. — WILLIAM C. SANDY, M.D.
GEORGE H. STEVENSON, M.D.

## EXECUTIVE ASSISTANT

AUSTIN M. DAVIES, PH.B. ..... 9 Rockefeller Plaza, New York, N. Y.

## CHAIRMEN OF COMMITTEES

*Board of Examiners*—SAMUEL W. HAMILTON, M.D., Washington, D. C.
*Nominating Committee*—R. FINLEY GAYLE, JR., M.D., Richmond, Va.
*Program*—KARL M. BOWMAN, M.D., San Francisco, Calif.
*Arrangements*—HARRY C. SOLOMON, M.D., Boston, Mass.
*Public Education*—C. CHARLES BURLINGAME, M.D., Hartford, Conn.
*Research*—ABRAHAM M. MYERSON, M.D., Boston, Mass.
*Nomenclature and Statistics*—NEIL A. DAYTON, M.D., Mansfield Depot, Conn.
*Psychiatric Nursing*—CHARLES P. FITZPATRICK, M.D., Howard, R. I.
*Psychiatric Standards and Policies*—FREDERICK W. PARSONS, M.D., New York, N. Y.
*Ethics*—JAMES W. VERNON, M.D., Morganton, N. C.
*Legal Aspects of Psychiatry*—PAUL L. SCHROEDER, M.D., Chicago, Ill.
*Psychiatric Social Service*—GEORGE S. STEVENSON, M.D., New York, N. Y.
*Psychiatry in Medical Education*—FRANKLIN G. EBAUGH, M.D., Denver, Colo.

# THE HYPOTHALAMUS IN PSYCHIATRY[1]

By JULES H. MASSERMAN, M.D., Chicago, Illinois

In the entire realm of psychosomatic theory there is perhaps no concept that keeps reappearing with such Phoenix-like disregard of limbo as the perennial myth that the hypothalamus is in some way a "center for emotion" (1, 3, 12, 16, 17). It is my present purpose to review the experimental basis for this theory and to report certain specific investigations of the subject carried out at the University of Chicago during the past five years.

## Animal Experimental Data

*Stimulation Experiments.*—If the hypothalamus of an unanesthetized, freely moving animal is stimulated electrically through an implanted electrode(21, 27) or by the direct injection of an analeptic drug(28, 31), the animal will show a fixed pattern of reactions characterized by piloerection, mydriasis, hissing, growling, lashing of the tail, and clawing, biting and running movements resembling those of rage or fear(45, 46). However, these "pseudo-affective" responses differ from those in integrated emotional states in that the hypothalamic reactions are not adapted to external circumstances, vary only in relation to the intensity and locale of the electrical stimulus to the hypothalamus, and cease abruptly when this stimulus is discontinued(33, 45). On phenomenological grounds alone then, the artificial activity induced by hypothalamic stimulation differs essentially from true affective behavior.

*Hypothalamic Destruction.*—The observation that animals with large experimental lesions of the hypothalamus are stuporous, somnolent and apathetic for variable periods (18, 19, 29, 37) has often been quoted as indicating that the hypothalamus functions as a source of "emotional drive." However, this interpretation is questionable, inasmuch as animals with extensive bilateral lesions of the hypothalamus show such profound disturbances in temperature control(47) and in fat(14), sugar(11, 48) and water(7) metabolism that only one in five survives longer than three days even under favorable circumstances(18). Moreover, electrical stimulation of structures about the destroyed hypothalamus in the operated animals induces definite pseudo-affective reactions(29), although these are not as well co-ordinated as in animals with an intact diencephalon(5, 23). Further, as the surviving animals gradually regain their normal body economy, so also do they recover their capacity for spontaneous and effective emotional behavior (37). The combined evidence from stimulation and destruction experiments therefore indicates that while the hypothalamus may function as an integrating and perhaps even a facilitating center in the sympathetic and motor pathways of emotional expression, it is probably neither the source nor the seat of experience of the emotions themselves.

*Pharmacologic.*—Some writers have implied that since drugs such as sodium amytal and metrazol influence emotions in human subjects and have also been shown to act on the hypothalamus of animals(27, 33), this "center" must in some way "control" emotion in both animals and humans. The weakness of this argument becomes more apparent when it is recalled that the drugs cited really act widely throughout the central nervous system(33), rendering their possible influence on emotion at best complex and indirect. Pharmacologic studies of this nature, therefore, have little heuristic value in the neurophysiological "localization" of emotion.[2]

*Conditioning Experiments.*—Finally, to investigate the question of the rôle of the

[1] Read at the ninety-seventh annual meeting of The American Psychiatric Association, Richmond, Virginia, May 5-9, 1941.

From the division of psychiatry, department of medicine and the Otho S. A. Sprague Institute, University of Chicago.

[2] To quote Rioch(47): "It is just as unjustifiable to say that emotion is localized in the hypothalamus as to say that the pseudo-affective rage reaction is localized in Dieter's vestibular nucleus—merely because the anti-gravity reflexes play a role in the mechanisms of the expression of the latter."

hypothalamus in emotion by more specific behavioristic criteria, four series of animal conditioning experiments were carried out according to the following methods:[3]

1. In initial control experiments, 32 cats were subjected to sound and light stimuli, followed either by an electric shock or by the giving of food, in order to induce the specific conditioned behavior of mounting an escape platform or opening a food box.

2. In a second control series, 19 of these conditioned animals were subjected to disturbing or frustrating stimuli (a startling air blast or an unexpected electric shock at the time of escape or feeding) in order to disrupt their conditioned response by the presentation of a conflict situation.

3. In a third series, 26 unconditioned and 4 conditioned animals were prepared for direct stimulation of the hypothalamus by the stereotactic insertion of a sterile bipolar electrode into this structure. After recovery from this operation the animals were subjected at intervals of several minutes to a selected visual or auditory signal followed within a few seconds by a typical "sham rage" reaction induced by electrical stimulation of the hypothalamus. These experiments were done on the following hypothesis: if stimulation of the hypothalamus in the waking, mobile animal produced actual rage or fear, then the animal would eventually become conditioned to show emotional reactions to the preliminary (conditional) signal; if, however, the hypothalamic stimulus produced only a syndrome of peripheral pseudo-affective responses without integrated experiential components, then the animal could not learn to react spontaneously to either the conditional or the central stimulus, since both would remain meaningless however often repeated.

4. Lastly, the action currents of the hypothalamus, as obtained through the implanted bipolar electrode, were recorded oscillographically during the exhibition of the peripheral sensory stimuli and also immediately following direct faradic stimulation of the hypothalamus. The results of these four series of experiments may be summarized as follows:

1. Although the speed and efficiency of learning varied, in from 20 to 80 trials nearly all of the animals could be taught to escape from the electric grid or to open the food box in response to a light or sound signal, demonstrating that conditioning occurs readily when (a) the behavior required lies within the reactive capacities of the animal and (b) there is an emotional *incentive* for the conditioned response, such as the satisfaction of hunger or an escape from the unpleasant effects of an electric shock.

2. However, when the established responses were disrupted by conflictful stimuli, the conditioned animals developed various manifestations of an "experimental neurosis," *e.g.*: trembling, crouching or attempts at escape at the feeding signal, refusal of food despite starvation for from 2 to 7 days, lowered startle threshold, compulsive and substitutive reactions such as stereotyped concealment of the head in the food box, fixated escape-patterns, excessive salivation and self-licking, etc., continuous restlessness with frequent vocalizations, and a change in characteristic behavior from normal friendliness to anxiety or diffuse aggressiveness in and out of the experimental situation. These "neurotic symptoms" were aggravated by intensifying the conflictful motivations through increased hunger, repeated frustration, or space-constriction (to which the animal reacted with manifestations of "claustrophobia"); conversely, the "neurosis" abated when the animal was made to feel more secure by petting, hand-feeding and gradual or forced re-adaptation to the problem situation(37). In effect, these observations indicated that both the conditioned and "experimentally neurotic" behavior induced by meaningful external situations possessed true affective connotations for the animal. In striking contrast, the results of the two test series showed that:

3. No animal subjected to direct hypothalamic conditioning was observed to show

[3] The apparatus and special techniques employed in these studies have been described in detail elsewhere(32). The experiments themselves and those on experimental neuroses were recorded on motion picture films exhibited at the 97th A. P. A. Meeting, Richmond, Virginia, May 5-9, 1941. These films will be distributed by the Psychological Cinema Exchange, Lehigh University, Bethlehem, Pa.

a determinative emotional response to the preliminary sensory signal alone even after this signal had invariably been followed by an artificially induced "sham rage" reaction for as many as 480 times over a period of 8 days. Moreover, the two animals conditioned to feed after a light signal continued to do so despite the peripheral manifestations of "sham rage" induced by mild electrical stimulation of the hypothalamus. More significantly, no animal showed evidences of an experimental neurosis even after being subjected to as many as 480 direct stimulations of the hypothalamus. Finally, in no instance did a peripheral [4] or central stimulus produce a significant change in the action currents of the hypothalamus in either the conditioned or unconditioned animals. The following deductions therefore seem justified: (a) emotionally adaptive and "experimental neurotic" behavior can readily be induced in cats by meaningful external situations, but not by artificial hypothalamic stimulation, and (b) despite the dramatic (but deceptive) emotional mimetic reactions produced by stimulation of this region, the hypothalamus apparently plays no significant rôle in the affective or conative experience of fear or rage.

## Clinical Considerations

During the past decade a number of loosely related clinical studies of hypothalamic function have been reported under headings such as the production of "emotional behavior" by mechanical or electrical stimulation of the hypothalamus in the human subject (15, 16); suggestive histopathologic changes in the hypothalamus in epilepsy (41, 50), mental deficiency (39) and in various psychoses (42); the relationship of anxiety or even of hysterical symptoms with so-called "hypothalamic storms" (3); the "seat" of the "Id" in the hypothalamus and of the "Ego" in the cortex (16), etc. Inconclusive in themselves on various technical and observational grounds, many of these reports seem to have been merely attempts to find some psychiatric application for what was considered to be a conclusion already demonstrated by animal experimentation: namely, that the hypothalamus mediated not only the pathways of affective expression but was itself the source and site of emotional experience. Curiously, authoritative and critical reviews by Bard (5), Rioch (47) and others (24, 25) pointing out the various fallacies in such misinterpretations of the experimental data were disregarded, as were the determinative observations by White (49) that direct electrical stimulation of the human hypothalamus produced no psychic effects other than transient drowsiness. If, then, the present report will again serve to call attention (a) to the lack of either an experimental or clinical basis for the concept of the hypothalamic origin of emotion, and (b) to the positive evidence for the contrary view, its purpose will have been served. In conclusion, it may be pointed out that even on behavioristic grounds, emotion must be considered as a highly complex psychobiologic reaction in which the organism behaves as a whole in its multiple but integrated response to a continually variable environmental field; in this sense, concepts of a simple anatomical or physiological "center of emotion" becomes psychosomatically unsound and scientifically sterile.

## Conclusion

There has recently arisen among certain psychiatrists a tendency to stress unduly the rôle of the hypothalamus as a dynamic "source" of emotion and even of "drive" or "instinct." A critical evaluation of the evidence, however, reveals the following:

1. Animal experimental work on the hypothalamus has indicated that this structure integrates and may possibly reinforce the effector neural impulses controlling some of the sympathetic and motor manifestations of emotion; however, there is little or no basis for the belief that the hypothalamus governs or even mediates the affective experiences themselves.

2. On the other hand, work in this laboratory has furnished evidence that such a direct psycho-somatic localization probably does not exist, inasmuch as (a) the reactions induced by stimulation of the hypothalamus do not significantly modify spontaneous be-

[4] Except that ruffling of the fur by an air blast produced a series of irregular, rapid (30-50 per second) waves in the hypothalamogram of 3 animals.

havior, (b) animals with extensive hypothalamic lesions can apparently react in an integrated affective manner, (c) animals subjected to prolonged conditioning procedures or to the induction of an experimental neurosis do not learn to respond to hypothalamic stimulation in ways analogous to their spontaneous or experimental adaptations to emotionally significant situations.

3. The clinical and pathological evidence as to the rôle of the human hypothalamus in emotional experience is not conclusive.

4. It would, therefore, seem safest in the present state of our knowledge to assign to the hypothalamus its experimentally demonstrable rôle in reinforcing and coordinating the neural and hormonal mechanisms of emotional *expression,* and reserve for adequate proof the hypothesis that it is either the dynamic source or the seat of experience of affective states. On the other hand, much experimental, psychological and clinical evidence clearly indicates that an emotion is a highly complex psychobiological phenomenon in which not only the central nervous system, but the entire body functions as a whole in its multiple adjustments to its milieu.

## BIBLIOGRAPHY


1. Alpers, Bernard J.: Relation of the hypothalamus to disorders of personality. Arch. Neurol. and Psychiat., **38**: 291, 1937.

2. Alpers, Bernard J.: Personality and emotional disorders associated with hypothalamic lesions. Ass. Res. Nerv. and Ment. Dis., **20**: 725, 1940; *Also:* Psychosomatic Medicine, **2**: 286, 1940.

3. Alvarez, W. C.: New light on the mechanisms by which nervousness causes discomfort. J. A. M. A., **115**: 1010, 1940.

4. Bard, Philip: A diencephalic mechanism for the expression of rage with specific references to the sympathetic nervous system. Am. J. Physiol., **84**: 490, 1928.

5. Bard, Philip: On emotional expression after decortication with some remarks on certain theoretical views. Psychol. Rev., **41**: 309, 424, 1934.

6. Bard, Philip, and Rioch, David McK.: A study of four cats deprived of neo-cortex and additional portions of the forebrain. Bull. Johns Hopkins Hosp., **60**: 73, 1937.

7. Bailey, P., and Bremer, F.: Experimental diabetes insipidus. Arch. Int. Med., **28**: 773, 1921.

8. Barris, R. W., and Ingram, W. R.: The effect of experimental hypothalamic lesions upon blood sugar. Am. J. Physiol., **114**: 555, 1936.

9. Brickner, R. M.: Certain characteristics of the cortical influence over the sympathetic nervous system. J. Nerv. and Ment. Dis., **71**: 698, 1930.

10. Clarke, R. H., and Henderson, E. E.: Investigations of the central nervous system: Methods and instruments. Baltimore, Johns Hopkins Press, 1920.

11. Cleveland, D., and Davis, L.: Further studies of the effect of hypothalamic lesions upon carbohydrate metabolism. Brain, **49**: 459, 1936.

12. Cushing, H.: Posterior pituitary hormone and parasympathetic nervous system. Proc. Nat. Acad. Sc., **17**: 163, 1931.

13. Gantt, W. Horsley: Contributions to the physiology of the conditioned reflex. Arch. Neurol. and Psychiat., **37**: 848, 1937.

14. Gildea, E. F., and Man, E. B.: The hypothalamus and fat metabolism. Assoc. Res. Nerv. and Ment. Dis., **20**: 501, 1940.

15. Grinker, R.: A method for studying and influencing cortico-hypothalamic relations. Science, **87**: 73, 1938.

16. Grinker, R., and McLean, H. V.: Depression treated by psychotherapy and metrazol. Psychosom. Med., **2**: 119, 1940.

17. Grinker, R.: Hypothalamic functions in psychosomatic interrelations. Psychosom. Med., **1**: 19, 1939.

18. Haertig, E. W., and Masserman, Jules H.: Hypothalamic lesions and pneumonia in cats. Jour. Neurophysiol., **3**: 393, 1940.

19. Ingram, W. R., Fisher, C., and Barris, R. W.: Effects of lesions in the hypothalamus in cats. Am. J. Physiol., **109**: 1, 57, 1934.

20. Ingram, W. R., and Ranson, S. W.: Bulbocapnine: effect on animals with lesions of the central nervous system. Arch. Neurol. and Psychiat., **31**: 987, 1934.

21. Kabat, H., Anson, B. J., Magoun, H. W., and Ranson, S. W.: Stimulation of the hypothalamus with special reference to the effect on gastro-intestinal motility. Am. J. Physiol., **112**: 214, 1935.

22. Karplus, J. P.: Ueber die Empfindlichkeit des Hypothalamus. Wien. klin. Wschr., **43**: 622, 1930.

23. Keller, A. D.: Autonomic discharges elicited by physiological stimuli in mid-brain preparations. Am. J. Physiol., **100**: 576, 1932.

24. Kennard, Margaret A.: The cortical influence on the autonomic system. Handbuch der Neurologie, **2**: 476, 1937.

25. Lashley, K. S.: The thalamus and emotion. Psychol. Review, **45**: 42, 1938; Experimental analysis of instinct behavior. *Ibid.,* p. 445.

26. Loucks, R. B.: The experimental delimitation of neural structures essential for learning: The attempt to condition striped muscle responses with faradization of the sigmoid gyri. J. Psychol., **1**: 5, 1935.

27. Masserman, J. H.: The effects of sodium amytal and other drugs on the reactivity of the hypothalamus of the cat. Arch. Neurol. and Psychiat., Chicago, **37**: 617, 1937.

28. Masserman, J. H.: The effect of strychnine sulphate on the emotional mimetic functions of the hypothalamus of the cat. J. Pharmacol., **64**: 335, 1938.

29. Masserman, J. H.: Destruction of the hypothalamus in cats. Arch. Neurol. and Psychiat., Chicago, **39**: 1250, 1938.

30. Masserman, J. H.: Effects of morphine sulphate on hypothalamus of the cat. Proc. Soc. Exp. Biol., N. Y., **42**: 315, 1939.

31. Masserman, J. H.: Action of metrazol (pentamethylenetetrazol) on the hypothalamus of the cat. Arch. Neurol. and Psychiat., Chicago, **41**: 504, 1939.

32. Masserman, J. H.: An automatic apparatus for the central conditioning of small animals. J. Comp. Psychol., **28**: 201, 1939.

33. Masserman, J. H.: Effects of analeptic drugs on the hypothalamus of the cat. Ass. Res. Nerv. Ment. Dis., **20**: 624, 1940.

34. Masserman, J. H.: Effects of dilute ethyl alcohol on cortico-hypothalamic functions. J. Pharm. and Exper. Ther., **40**: 450, 1940.

35. Masserman, J. H., and Haertig, E. W.: The influence of hypothalamic stimulation on intestinal activity. J. Neurophysiol., **1**: 350, 1938.

36. Masserman, J. H., and Jacobson, L.: The effects of ethyl alcohol on the cerebral cortex and hypothalamus of the cat. Arch. Neurol. and Psychiat., **43**: 334, 1940.

37. Masserman, J. H.: The rôle of the hypothalamus in emotional expression. Motion picture film, 16 mm. black and white, subtitled. Four parts, each about 450 feet. The Psychological Cinema Exchange, Adelbert Ford, editor, Lehigh University, Bethlehem, Pa.

38. Morgan, L. O.: Cell-changes in some of the hypothalamic nuclei in experimental fever. J. Neurophysiol., **1**: 281, 1938.

39. Morgan, L. O.: Alterations in the hypothalamus in mental deficiency. Psychosom. Med., **1**: 496, 1939.

40. Morgan, L. O.: Cell changes in hypothalamus in the major psychoses. Ass. Res. Nerv. & Ment. Dis., **20**: 753, 1940.

41. Morgan, L. O., and Gregory, H. S.: Pathological changes in the region of the tuber cinereum in idiopathic epilepsy. Am. J. Psychiat., **9**: 805, 1930.

42. Morgan, L. O., and Gregory, H. S.: Pathological changes in the tuber cinereum in a group of psychoses. J. Nerv. and Ment. Dis., **82**: 286, 1935.

43. Papez, James W.: A proposed mechanism of emotion. Arch. Neurol. and Psychiat., **39**: 725, 1937.

44. Ranson, S. W.: Autonomic reactions induced by electrical stimulation of the hypothalamus. Amer. J. Physiol., **109**: 1934.

45. Ranson, S. W.: The hypothalamus: Its significance for visceral innervation and emotional expression. Tr. College of Physicians, Phila., 4th Series, **32**: 222, 1934.

46. Ranson, S. W.: Regulation of body temperature. Ass. Res. Nerv. and Ment. Dis., **20**: 342, 1940.

47. Rioch, David McK.: Certain aspects of the behavior of decorticate animals. Psychiatry, **1**: 339, 1938.

48. Sachs, E., and MacDonald, M. E.: Blood sugar studies in experimental pituitary and hypothalamic lesions with a review of the literature. Arch. Neurol. and Psychiat., **13**: 335, 1925.

49. White, J. C.: Autonomic discharge from stimulation of the hypothalamus in man. Ass. Res. Nerv. and Ment. Dis., **20**: 854, 1940.

50. Yakovlev, P. I.: Neurological mechanisms concerned in epileptic seizures. Arch. Neurol. and Psychiat., **37**: 523, 1937.

# "SHAM RAGE" IN MAN[1]

By HERMAN WORTIS, M.D., AND WILLIAM S. MAURER, M.D.

*New York, N. Y.*

Cannon and Britton(1) demonstrated that when the cortex of the cat is disconnected from lower centers and the animal allowed to emerge from anaesthesia, spontaneous outbursts of motor activity *resembling* fear and rage occur, accompanied by changes in the internal organs and in the composition of the blood similar to those that characterize affective behavior in man. Because of the absence of cortical and presumably psychic elements in the reaction, they wisely suggested the term "sham rage." These investigators were not however the first to observe such behavior in decorticate animals. Goltz (1892)(2), Dusser de Barenne (1920)(3) and Rothmann (1923)(4) had previously noted signs resembling rage and fear in their decorticate animals, and all suggested that these signs of emotional activity were the result of the removal of cortical inhibitory control.

It remained for Bard(5) to show that the expression of sham rage was dependent on the functional integrity of the caudal hypothalamus. The method used was that of ablation of varying portions of the brain stem after removal of the hemispheres. This localization was worked out in a series of 46 acute experiments as well as in four chronic decorticate cats and three chronic decorticate dogs(6, 7). In acute experiments it was found that the typical sham rage appeared regularly after removal of all parts of the brain cranial to the diencephalon and after removal of the dorsal part of the thalamus. It invariably failed to appear after sections which separated the ventral and most caudal portions of the diencephalon from the mid-brain. This led to the conclusion that the *expression* of anger in these animals was dependent on central mechanisms located in the caudal hypothalamus. Bard(8) also pointed out that this "sham rage" of the decorticate or diencephalic animal closely resembles the behavior of the infuriated normal animal, and that it is far more readily elicited and is more expressive of an affective state than are the pseudo-affective states shown by completely decerebrate preparations.

The motor activities accompanying this behavior are both somatic and visceral. A struggling, lashing, crawling, snarling animal results showing all the signs of widespread activation of the sympathetic nervous system. These include erection of the hair, dilatation of the pupils, exophthalmos, retraction of the nictitating membranes, profuse sweating from the toe pads, considerable increments in arterial blood pressure and heart rate, together with a discharge of adrenalin from the adrenal medulla.

It is further significant that the animals rarely made any attempt to escape or move away while the stimulus was being applied, and the response rarely outlasted the stimulus, after-discharge being minimal. For example, it was always safe, immediately after stopping the stimulus, to place one's finger against the cat's mouth. Although a moment before, the cat had been in a blind rage, biting any object put within reach of its jaws, the only result of this procedure after stimulation had ceased was to induce the usual licking response.

Fulton and Ingraham(9) noted similar behavior in 3 of 4 cats subjected to an operation in which incisions were made in the brain anterior to the optic chiasm from the mid-line to the olfactory radiation. They concluded that they had divided the hypothetical cortico-hypothalamic tracts.

Similar behavior has been noted in animals and humans as a result of direct and indirect electrical stimulation of the hypothalamus(10), and as the result of tumors(11) in this region.

[1] From the medical service of the psychiatric division, Bellevue Hospital, New York City, and the departments of psychiatry and medicine, New York University College of Medicine.

Presented at the meeting of the New York Neurological Society, at the New York Academy of Medicine, December 2, 1941.

The available evidence thus leaves little doubt that the integration of the processes concerned in the emotional *expressions* of rage and fear occurs centrally in the hypothalamus. Here are contained the nuclei and fibre tracts which mediate the hormonal changes and sympathetic and skeletal motor manifestations commonly seen in affective states. Nevertheless, the evidence thus far quoted does not decide whether direct stimulation of the hypothalamus or allowing the hypothalamus to act in uninhibited fashion give rise to the actual *experience* of fear, rage, or any other affect as such in the human being(19).

We therefore feel justified in presenting two cases of "sham rage" in human beings in the hope that they will contribute in some small measure to a better understanding of some of these problems.

## CASE REPORTS

CASE 1.—C. S., a 32-year-old female was admitted to the medical service of the Bellevue Psychiatric Hospital with a history of having been in coma for 36 hours. The history obtained from her lover was admittedly incomplete, but the essential facts are as follows: The patient had been a chronic alcoholic for at least six years and for several weeks prior to admission had been drinking heavily and eating little food. Six months prior to admission, a physician who examined her during an alcoholic debauch discovered sugar in her urine, and without any further investigation advised her to take insulin. Three days before admission her friends noted a change from her usual amiable alcoholic self. Her speech became thick and unintelligible. She was confused, often failed to recognize her friends, and was given to fits of choleric temper succeeded by periods of apathy. During one of these periods, she asked her lover to give her an injection of insulin. Since she was obviously ill, he decided to give her a double dose in order to make certain that "at least some of it would work." Soon afterward she lapsed into coma which her friends assumed was alcoholic, and remained in that state for 36 hours. At that time, she began to convulse, and it was decided to call an ambulance.

On admission she was stuporous, picked at the bed clothes and showed intermittent extensor rigidities and mild opisthotonous. There was a double Babinski toe sign, and no response to painful stimulation. The temperature was 100° F., pulse 112 and regular, respirations 22 per minute, even and deep, blood pressure 120/80. There was marked evidence of dehydration. Neurological examination, within the limits of the patient's cooperation, was otherwise entirely normal except for marked depression of all the deep reflexes. The laboratory examinations were essentially normal[2] except that the blood sugar was reported as below 20 mg. per cent, and the cholesterol determinations were very low, suggesting impairment of liver function.

She was given 100 c.c. of 50 per cent glucose solution intravenously, followed by an infusion of 2000 c.c. of 10 per cent glucose in normal saline. The usual routine of glucose injections, vitamins, glucose and fluids by Levine tube and transfusion were instituted and by the 4th hospital day the patient was no longer in coma. At this time, she presented a very bizarre picture. Vocalization consisted of one or two meaningless words buried in a stream of unintelligible jabber. Otherwise she gave practically no evidence of any contact with her environment and would frequently assume catatonic postures. When stimulated painfully or by loud sounds and more usually without any external stimulation, she showed signs of diffuse sympathetic discharge. The reaction was stereotyped and lasted from 30 seconds to 2 minutes. During these attacks her palpebral fissures widened, exophthalmos occurred and the pupils dilated so widely that the iris was no longer visible. The pulse rose from 100 to 140, the blood pressure from 120-170, she would strike out blindly, frequently, but by no means invariably, in the direction of the stimulation and would literally snarl and spit. The respirations were forced and rapid; sweating was generalized. *These responses were at no time purposeful.* She never made any attempt to avoid the stimulus, and there was never any evidence of aggression directed against the examiners.

These reactions were observed in almost unchanged fashion for 30 days, occurring on the average of 100 times a day. During the latter part of her hospital stay, and coincidental with definite but slight clinical improvement, she would show much more appropriate responses. She would swear at the examiners, frequently attempt to free herself from her restraints, and was obviously annoyed at the approach of the examiners. Even at this time, however, her responses were out of all proportion to the applied stimulus, and attacks

[2] *Urine:* Specific gravity 1026. Sugar: 0. Albumin: 0. Acetone: 4 plus. Diacetic acid: 0. Microscopic: normal.

*Blood count:* R.B.C.: 3.9 million. Hgb.: 70 per cent. W.B.C.: 18,400 with normal differential count.

*N.P.N.:* 22 mg. per cent.

*Icteric index:* 0.5 mg. bilirubin per 100 c.c. serum.

*Van den Bergh:* Direct delayed.

*Albumin globulin ratio:* 5.7/2.1.

*Total cholesterol:* 76 mg. per cent.

*Cholesterol esters:* 38 mg. per cent.

*Serum calcium:* 10.5 mg. per cent.

*Serum phosphorus:* 5.1 mg. per cent.

*Glucose tolerance test* (seventh hospital day): Fasting: 107. ½ hr.: 207. 1 hr.: 242. 2 hr.: 206. 3 hr.: 118. 4 hr.: 80.

*Spinal fluid:* Normal as regards pressure, cytology, chemistry and serology.

continued to occur without any obvious external stimulation.

She was then sent to a state hospital where she eventually died of pneumonia. Autopsy revealed, in addition, evidences of generalized "cerebral softening." Histopathological sections unfortunately were not made, and no further pathological data are available.

*Comment.*—The brain, unlike other organs, oxidizes for all practical purposes only one foodstuff, carbohydrate(12). Hence, as the available carbohydrate diminishes, the metabolism of the brain must necessarily diminish. This is clearly reflected in the diminished oxygen uptake during hypoglycemia(13,14). Even in severe diabetes, when the rest of the body obtains most of its energy from the utilization of protein and fat, the brain continues to burn carbohydrate(12). This is particularly important since the cerebral store of glycogen is a meagre one, and the brain is therefore dependent on circulating glucose to satisfy its energy demands.

The work of Himwich and his co-workers shows further that the effects of insulin hypoglycemia descend through the brain in a manner which may be determined phylogenetically(15). First, the activity of the cortex becomes suppressed, releasing the basal ganglia and the hypothalamus. As time proceeds, these symptoms disappear, in turn, and give rise to symptoms which may be associated with the mid-brain, and finally the medullary centers are involved and death may result. Thus, the progress of the symptoms during hypoglycemia may be ascribed to a greater sensitivity of the newer portions of the brain to metabolic lack. Even when the amount of glucose injected is adequate to supply the energy requirements of all parts of the brain, experiments on hypoglycemic animals reveal that *the electrical activity of the hypothalamus is restored before that of the cortex*(16). Similar findings were noted by Ziskind(17) who attacked the problem from a neuropathological point of view. Finally, it is obvious from both experimental and clinical data that if the hypoglycemia is continued too long, irreversible changes may set in with permanent damage to brain function.

In the case described, the clinical course, the behavior displayed and the gross neuropathological report make it probable that the sham rage was the result of marked cortical damage with the freeing of the hypothalamus from cortical control. The cortex had apparently suffered from the effects of hypoglycemia for too long a period to allow a return of adequate function in this structure.

CASE 2.—M. S., 3 24-year-old white female, was found unconscious in a locked and gas-filled hotel room, obviously an attempted suicide. After emergency treatment with a pulmotor and nasal oxygen by a police emergency squad, she was brought to Bellevue Hospital.

On admission: T. 99°, P. 108, R. 28. The patient was comatose and did not respond to painful stimuli. She was slightly cyanotic and was receiving oxygen through a nasal catheter. There were changing rigidities of all four extremities with the deep reflexes varying from absent to hyperactive. The abdominals were absent and there was no response to plantar stimulation. Laboratory work-up was essentially normal.[3] No test was made for carbon-monoxide hemoglobin since the diagnosis was obvious.

She was given a transfusion of whole citrated blood, followed by a slow infusion of 5 per cent glucose in normal saline to a daily total of 3000 c.c. An airway was inserted through which oxygen was administered, and vitamins B and C were administered parenterally. The usual precautions were taken to avoid shock and the development of pneumonia.

Eighteen hours later her coma was lighter, and she now responded to painful stimulation by slight squirming movements. Cyanosis persisted despite oxygen therapy. The changing rigidities of the extremities were still present, but the deep reflexes were now constantly hyperactive and there was a double Babinski toe sign. On the second hospital day the picture was essentially unchanged, except that the patient developed signs of consolidation in the right upper lobe. The usual pneumonia treatment was administered and sulfapyridine was started by the intravenous route. On the third hospital day, the patient was somewhat cleared and showed a very definite response to stimulation. At this time, loud noises and painful stimuli almost invariably produced the following responses: the pupils dilated, the palpebral fissures widened and noticeable exophthalmos occurred. She clenched and ground her teeth, emitting hissing sounds. The pulse rose from 96 to 120 per minute, the blood pressure from 120 to 150 systolic. There was gen-

[3] *Urine:* Specific gravity 1012. Reaction: acid. Albumin: trace. Sugar: 0. Microscopic: normal.
*Blood count:* R.B.C.: 4.46 million. Hgb.: 80 per cent. W.B.C.: 12,650 with 82 per cent polys and no abnormal cells.
*Blood sugar:* 136 mg. per cent.
*Blood Wassermann:* Negative.
*Spinal tap:* Normal as regards pressure, cytology, chemistry and serology.

eralized sweating and goose flesh over the entire body surface. This response to all strong stimuli was uniform and usually lasted from 30 seconds to one minute; the strength of the stimulus had no apparent relationship to the duration of the "sham rage," and attacks frequently occurred without any obvious external stimulus. These reactions persisted but grew feebler during the next 24 hours, and the patient expired five days after exposure to illuminating gas. During the last six hours, the patient lapsed into very deep coma, and these responses could no longer be obtained.

Necropsy performed twelve hours post-mortem by Dr. Milton Helpern, assistant medical examiner, revealed "extensive lesions in the brain, two trophic skin blisters on the ankle and hip, and a hypostatic bronchopneumonia, all resulting from the carbon monoxide asphyxiation.

"The pial blood vessels over the entire brain were markedly congested. A horizontal section of the brain through the basal ganglia revealed the characteristic symmetrical fresh anemic necrosis of the anterior two-thirds of the globus pallidus on each side usually encountered in delayed deaths from carbon monoxide poisoning. In addition, the cerebral white matter was congested and edematous and contained many punctate hemorrhages 1 to 2 mm. and occasionally 3 mm. in diameter. These were especially numerous in the subcortical regions. Some of these hemorrhages were streaked. Sections through the cerebellum, pons and medulla revealed congestion, but no hemorrhages.

"The microscopic findings in the cerebrum were essentially the following: intense congestion of the small blood vessels of the meninges, cortex and white matter; many small variable-sized ball-shaped and occasional ring-shaped hemorrhages in the white matter especially beneath the cortex; perivascular and perineuronal edema and chromatolysis of nerve cells in the cortex; edema of the white matter; occasional agglutinative capillary thromboses and capillary necroses, early exudation of polymorphonuclear leucocytes and an increase and proliferation of microglia in the white matter.

"The following microscopic changes were found in the globus pallidus: a zone of demarcation between the poorly stained necrotic area and the surrounding tissue containing many congested capillaries and small hemorrhages; active proliferation, with frequent mitotic figures, of histiocytes arising from adventitial cells of the arterioles and from cells adjacent to dilated capillaries; early exudation of polymorphonuclear leucocytes from capillaries and arterioles; chromatolysis, neuronophagia and disappearance of nerve cells and degeneration of capillary walls in the necrotic area.

"There were no obvious microscopic changes in the cerebellum and medulla other than congestion.

"Section of the myocardium revealed a slight amount of interstitial edema."

*Comment.*—As is well known, carbon monoxide has a greater affinity than oxygen for hemoglobin, and therefore partially or completely displaces oxygen from the erythrocytes. Not only does carbon monoxide act by replacing oxygen in the erythrocytes, but it also exerts a deleterious effect upon certain tissue cells, causes vasomotor paralysis and interferes with certain enzyme systems necessary for proper brain oxidation(18). However, suffice it to say that as regards the brain, the cortex and basal ganglia usually suffer most and histopathological examination reveals petechial hemorrhages and areas of focal softening. This is exactly what happened in our case 2, with the resultant development of "sham rage." Here again we can only be certain that we have observed the *expression* of emotional reaction. Whether the patient actually felt rage is debatable. In this sense then the uninhibited hypothalamus may be regarded as a functional area concerned with the *expression* of emotional reactions. These are ordinarily controlled by higher structures which are more sensitive to metabolic lack, and which normally exert an inhibitory influence over such reactions. When these higher structures are injured, the hypothalamus may act in uninhibited fashion with resultant "sham rage."

## Discussion

Masserman(19), in a very stimulating article, has questioned the thesis that the hypothalamus represents a center of emotional feeling. These cases, we believe, tend to confirm his point of view.

1. At no time was there any after-discharge as would occur if the patients were experiencing true rage or fear.

2. Despite the fact that the authors induced several hundred "attacks," our approach to the bedside was never a source of anxiety to the patients.

3. The rage was never purposeful. At no time did the patients attempt to untie their restraints, strike the examiner or escape painful stimuli. It is therefore of great importance to note that in case 1 as the patient improved (and presumably developed some cortical control) her behavior became slightly more adaptive and purposeful.

Note how neatly our cases fit in with Masserman's description(19) of his cats follow-

ing electrical or pharmacological stimulation of the hypothalamus:

"When a 60 cycle current of from 2-4 volts is applied through an implanted bipolar needle electrode directly to the hypothalamus of an unanaesthetized, freely moving cat, the animal begins to retract its ears, crouch, growl, raise its back and lash its tail and to show a crescendo of the following typical sympathetic and motor reactions: hyperpnoea, salivation, mydriasis with widening palpebrae, piloerection, biting and striking movements with claws unsheathed and finally, precipitate running as though in blind attempts to escape. Similar but more intensive activity may be induced by the intrahypothalamic injection of 0.05 c.c. of 10 per cent metrazol or.01 picrotoxin. Nevertheless, much as these reactions resemble those of fear and rage, they differ from the latter in certain significant respects. For instance, the ostensibly aggressive activity during hypothalamic activity is not directed toward specific objects in the animal's environment, even when these are manipulated so as directly to irritate the animal. Again the responses induced by hypothalamic stimulation are not adapted to the surroundings: *e.g.*, the cat will dash itself repeatedly against the sides of the cage and neglect a readily available avenue of escape. Moreover, all the pseudo-affective reactions cease abruptly at the end of the stimulation without leaving any of the residua (mewing, trembling, hiding, etc.) ordinarily observed after true emotional states. In effect, the activity induced by hypothalamic stimulation is mechanical, diffuse, stereotyped, stimulus-bound, and seems to carry no greater emotional connotation than would the contraction of a skeletel muscle induced by the stimulation of an efferent nerve. On these phenomenological grounds alone then, pseudo-affective reactions differ significantly from those in true emotional states. Furthermore, such an animal will continue to show normal behavior, until mechanically interfered with by the mechanical components of the pseudo-affective response. For example, the animal will often continue to lap milk, purr, clean its fur or respond to petting during hypothalamic stimulation despite the appearance of mydriasis, salivation, horripilation and other typical manifestations of "sham rage." When these observations are contrasted with the immediate abandonment of feeding, purring or concentrative activities under the influence of true fear or rage, produced for instance by the sight of a dog, the conclusion becomes evident that faradic stimulation of the hypothalamus produces either no significant change in emotional attitude, or that the affective modifications are so minor as to exert no significant influence on normal behavior patterns."

Finally, Masserman was unable to condition hypothalamic responses in experimental animals. He concluded that there was no evidence that peripheral "pseudo-affective" reactions could be mechanically "engrammed" by any number of attempts at central conditioning. In his experiments then, the hypothalamus was shown to behave not as an afferent, experience-mediating organ but as a way-station on efferent sympathetic and motor pathways which cannot be conditioned by direct stimulation. This was also true for our patients. They showed no response to our approach to the bedside, although we invariably tried to provoke attacks.

Similarly, Rioch(20) has found that in decorticate cats: "If a vigorous pseudo-affective rage reaction is evoked and immediately on cessation of the painful stimulus the animal's back is gently rubbed, the rage reaction promptly subsides, and an entirely normal licking response supervenes. . . . ." This type of behavior is in startling contrast to that of normal cats or of cats with the cortex of only one frontal pole remaining intact.

It would therefore seem that while subcortical centers (the hypothalamus) may integrate and possibly reinforce the effector neural responses controlling some of the sympathetic and motor manifestations of fear and rage, there is little or no basis for the thesis that the hypothalamus governs or even mediates the emotional experiences themselves.

It must, however, be clearly recognized that the situation in man and in the experimental animal have several important points of difference. In man, symbolization has to a large extent replaced more visceral methods of expression. This fact alone may explain to a large extent the paucity of reported cases of "sham rage" in human beings.

Conclusions drawn from animal experiments are not always directly applicable to man in whom the organization of the nervous system is certainly more complex. It must be remembered that autonomic responses can be obtained from levels of the nervous system, both higher and lower than the hypothalamus. If this be true in the experimental animal, the comparative cephalization of function in the human makes it highly probable that direct cortical control of the bodily processes involved in emotion is even more highly developed in man (19, 21). In this connection it is particularly

significant that direct electrical stimulation of the human hypothalamus(22) in eight patients during intracranial operations under local anaesthesia produced only moderate changes in the heart rate and blood pressure, accompanied by no psychic or sensory effects other than drowsiness in four of the cases.

We can thus compare the relation of the hypothalamus to cortical autonomic centers as the extrapyramidal motor system to cortical motor areas(23). Removal of the latter results in overactivity of the previously inhibited extrapyramidal system. Removal of the cortical autonomic centers results in overactivity of the hypothalamic functions.

Thus we see that the cortex damps down hypothalamic responses and permits its activity upon appropriate occasions, and then in graded and modulated fashion. Were this not the case, stimuli of all sorts would evoke rage and flight reactions incapable of restriction. However, instead of such reflex behavior, the normal adult is able to develop a more adaptive response. With functional or anatomical severance of the cortex from the hypothalamus, these finer adaptive responses are lost and the more primitive type of over-reaction is seen.

Thus, Grinker(24) in discussing the relation of cortex to hypothalamus in the production of human symptomatology states: "It is not impossible that either anatomical or functional lesions in the hypothalamus or its connections with the cortex may cause complete or partial release of cortical (ideational) control of the emotional content of higher activities. The dominant external activity would then be, not a slow adaptive response produced by a process of long-circuiting but a less deliberate (impulsive) response with accompanying visceromotor correlates of emotional reactions."

At this point, it might be well to mention the ingenious experiments of Grinker and Serota(10). These investigators screwed electrodes into the hard palate, cranium and nasal bones of the cat and observed that in the oscillographic tracings taken from the "hypothalamic" (palatal-nasal) lead there occurred 4-5 per second waves of 30-50 microvolts upon which were superimposed others of 13 per second and 12-15 microvolts. The slow waves were increased 25 to 50 per cent in voltage and accelerated to 5-7 per second when recorded 7-8 seconds after an induction shock was passed through the palatal-nasal electrodes. Such stimulation also caused the appearance of spikes, cusps and beta waves in the "cortical" (cranio-nasal) tracing—an effect which disappeared after destruction of the hypothalamus and which was therefore interpreted as evidence for the hypothalamic "control" of cortical activity. In experiments on human subjects, the passage of a strong electric current caused pharyngeal pain accompanied by pupillary dilatation, perspiration, rise in blood pressure and occasionally persistent hyperthemia (up to 103° F. for "several days"), effects attributed by the authors to hypothalamic stimulation. As to psychological effects, they report that "apart from transient pain responses, sometimes anxiety appeared during stimulation and it persisted with crying and expressions of fear often for some minutes. In one subject protracted sobbing occurred. Several patients saw their lives pass before their eyes as has been described in drowning." He notes that none of the patients reacted with anger, they all reacted with fear. Masserman(19) and Hoagland and his co-workers(25) have criticized the author's right to the terms "hypothalamic lead" or " hypothalamic stimulation," but Grinker's work represents an original and ingenious attempt to solve a very difficult problem. Furthermore, it should not be forgotten that these investigators were stimulating the hypothalamus of individuals with a functioning cerebral cortex.

In many of the animal experiments reported, the cortex has been removed while the hypothalamus remained. In many of the human cases, the hypothalamus has been partially or totally destroyed. Even though this difference may be more apparent than real, it is significant that our cases more nearly approximate the condition of Bard's experimental animals. In both instances we seem to be dealing with examples of decortication. In Bard's experiments the decortication was anatomical, in our cases it was originally metabolic, only terminally leading to anatomical changes.

## Summary and Conclusions

1. The literature relative to "sham rage" is reviewed.

2. Two cases of "sham rage" in human beings are presented; one following insulin hypoglycemia, the other following carbon monoxide poisoning. In both cases, the involvement of higher centers is stressed, and the resultant "sham rage" is believed to be the result of uninhibited hypothalamic discharge.

3. The expression of emotion does not necessarily mean that the individual is experiencing that emotion.

4. There seems to be no reason for accepting the idea that the hypothalamus is the "emotional center" of the body. Affects and emotions are highly complicated psychosomatic processes, which require among other things a functioning cerebral cortex.

## BIBLIOGRAPHY

1. Cannon, W. B., and Britton, S. W.: Studies on the conditions of activity in endocrine glands. Am. J. Physiol., **72**: 283, April 1925.

2. Goltz, F.: Der Hund ohne Grosshirn; Siebente Abhandlung über die Verrichtungen des Grosshirns. Arch. f. d. ges. Physiol., Bonn, 1891, li, 570, 1 pl.

3. Dusser de Barenne, J. G.: Recherches experimentales sur les fonctions du systeme nerveux central, faites en particulier sur deux chats dont le neopallium avait ete enlevé. Arch. neerl. de physiol., **4**: 31, 1919.

4. Rothmann, H.: Zuzammenfassender Bericht über den Rothmannschen grosshirnlosen Hund nach klinischer und anatomischer Untersuchung. Z. ges. Neurol. Psychiat., **87**: 247, 1923.

5. Bard, P.: A diencephalic mechanism for the expression of rage with specific reference to the sympathetic nervous system. Am. J. Physiol., **84**: 490, April 1928.

6. Bard, P., and Rioch, D. M.: A study of four cats deprived of neocortex and additional portions of the forebrain. Johns Hopkins Hosp. Bull., **60**: 73, Feb. 1937.

7. Bard, P.: Central nervous mechanisms for emotional behavior patterns in animals. Assoc. Research Nerv. & Ment. Dis., Proc. (1938), **19**: 190, 1939.

8. Bard, P.: On emotional expression after decortication with some remarks on certain theoretical views. Psychol. Rev., **41**: 309 and 424, July and Sept. 1934.

9. Fulton, J. F., and Ingraham, F. D.: Emotional disturbances following experimental lesions of the base of the brain (pre-chiasmal). Am. J. Physiol., **90**: 353, Oct. 1929.

10. Grinker, R. R., and Serota, H.: Studies on cortico-hypothalamic relations in cat and man. J. Neurophysiol., **1**: 573, Nov. 1938.

11. Alpers, B. J.: Personality and emotional disorders associated with hypothalamic lesions. Psychomatic Med., **2**: 286, July 1940.

12. Himwich, H. E., and Nahum, L. H.: Respiratory quotient of brain. Am. J. Physiol., **90**: 389, Oct. 1929.

13. Himwich, H. E., Bowman, K. M., Wortis, J., and Fazekas, J. F.: Biochemical changes occurring in the cerebral blood during the insulin treatment of schizophrenia. J. Nerv. & Ment. Dis., **89**: 273, March 1939.

14. Himwich, H. E., Bowman, K. M., Wortis, J., and Fazekas, J. F.: Metabolism of the brain during insulin and metrazol treatments of schizophrenia. J.A.M.A., **112**: 1572, April 1939.

15. Himwich, H. E., Frostig, J. P., Fazekas, J. F., and Hadidian, Z.: Mechanism of symptoms of insulin hypoglycemia. Am. J. Psychiat., **96**: 371, Sept. 1939.

16. Hoagland, H., Himwich, H. E., Campbell, E., Fazekas, J. F., and Hadidian, Z.: Effects of hypoglycemia and pentobarbital sodium on electrical activity of cerebral cortex and hypothalamus (Dogs). J. Neurophysiol., **2**: 276, July 1939.

17. Ziskind, E., and Tyler, D. B.: Decorticate and decerebrate preparations produced by insulin shock. Proc. Soc. Exper. Biol. & Med., **43**: 734, April 1940.

18. Bing, R., and Haymaker, W.: Textbook of nervous diseases, 5th ed., C. V. Mosby Co., St. Louis, 1939.

19. Masserman, J. H.: Is the hypothalamus a center of emotion? Psychosomatic Med., **3**: 3, Jan. 1941.

20. Rioch, D. M.: Certain aspects of behavior of decorticate cats. Psychiatry, **1**: 339, August 1938.

21. Fulton, J. F.: Physiology of the nervous system, Oxford Press, N. Y. 1938.

22. White, J. C.: Autonomic discharge from stimulation of the hypothalamus in man. Assoc. Research. Nerv. & Ment. Dis., Proc. (1938), **20**: 854, 1940.

23. Grinker, R. R.: Hypothalamic functions in psychosomatic interrelations. Psychosomatic Med., **1**: 19, Jan. 1939.

24. Grinker, R. R.: Neurology, 2nd ed. Thomas & Co., Springfield, Ill., 1937.

25. Hoagland, H., Cameron, D. E., Rubin, M. A., and Tegelberg, J. J.: Emotion in man as tested by the delta index of the electroencephalogram: II. Simultaneous records from cortex and from a region near the hypothalamus. J. Gen. Psychol., **19**: 247, Oct. 1938.

# A STUDY OF MANIC-DEPRESSIVE PSYCHOSES OCCURRING DURING THE LATER LIFE PERIOD[1]

By EDWIN J. DOTY, M.D., New York, N. Y.

In recent years there has been an increasing interest in the medical problems of patients in the later life period. The lengthening of the average life span, which has resulted from the application of the advances made by medical science, has meant that physicians are more frequently confronted with psychological and physical problems in older patients.

For some time the staff of The Payne Whitney Psychiatric Clinic of The New York Hospital has been interested in the psychopathology of aging, and this report presents observations that have been made concerning one aspect of this general problem.

The purpose of this study of the manic-depressive psychoses occurring in later life is to ascertain if there are any features characteristic of these disorders which are clearly enough defined to be of value in formulating concepts regarding etiology, psychopathological picture, treatment and prognosis. The material is derived from the clinical records of 25 patients. The following criteria were used in their selection. The patients either had had a first attack of manic excitement during or after their fortieth year of life, or in the same age period they had had the first attack of a phasic affective illness in which alternating periods of excitement and depression became evident as the course of the illness continued. Therefore, a somewhat limited concept of manic-depressive psychosis was followed, and cases of recurrent depressions and involutional melancholia were excluded. Also, patients showing at the time of admission definite psychopathological evidence of cerebral arteriosclerosis or senile changes were not included. The patients studied had all been first admitted to the hospital in the period of 1933 to 1940 inclusive. During this eight-year period, the ratio of male to female admissions averaged 1 to 1.9. This preponderance of female patients is reflected in the present series comprising 18 female and 7 male patients. The female patients ranged in age at the time of admission from 41 to 69 years, averaging 51 years. The male patients ranged in age from 48 to 59 years, averaging 54 years.

The civil status of the female patients was, 10 married, 4 unmarried, 3 widowed, and 1 divorced. All of the male patients were married, 2 of them for the second time following divorce. The information obtained from the study of these patients was summarized, and is presented in the order in which these facts are arranged in a clinical record.

The presenting symptoms of the total group at the time of admission, considered in terms of behavior and mood, showed some variation. Ten patients were definitely elated and overactive. Six were depressed and appeared slowed in their reactions. Three had a depressive mood and showed agitation. One patient might be described as having a simple type of depression. Anxiety was not a common symptom in the depressed patients, occurring in only 3 instances. Of the remaining patients, 3 had paranoid features and in 2, these were associated with manic behavior. In another the paranoid features were in the setting of depression. Finally, 2 patients presented the picture of a manic excitement with associated delirious features, the latter presumably on a physiogenic basis.

A study of the special preoccupations of the entire group showed that 18 had somatic preoccupations of varying degrees of intensity. In a few patients these complaints were of a mild degree and usually referred to the gastrointestinal tract. However, other patients had different concerns, including the belief of having cancer as well as certain fixed ideas of bodily change. Six patients had delusions referring to sexual topics, and 5 manic patients had erotic attitudes of importance. Every patient with depression had ideas of guilt, unworthiness or feelings of

[1] From The New York Hospital and the Department of Psychiatry, Cornell University Medical College, New York.

inadequacy. These guilt reactions were often related to reality factors such as previous financial extravagance, other economic concerns, or to sexual deviations. Others were concerned with defections that might be termed sins of omission, rather than sins of commission, as well as apprehending the future results of what they regarded as their personal failures or inadequacies. Only 5 patients had ideas somewhat removed from reality. Six patients experienced hallucinations which disappeared as the patients' psychological and physical conditions improved. Six patients had definitely expressed suicidal preoccupations, but only 2 had made serious attempts at self-destruction. As to insight, relatively few had any real appreciation of their illness.

The duration of the illness, for which the patient was admitted, varied from a few days to several years. If 2 patients, whose illness seemed to have existed for several years before admission were excluded, the average duration of illness before first admission would be approximately two and one-half months. However, in reviewing the life histories of the entire group, it was found that 16 (or nearly two-thirds) had had previous attacks of affective illness, the first of which was during or after their fortieth year.

In studying these previous attacks, it was found that 4 patients had had a previous attack within a period of two years or less, preceding their illness at the time of admission. One patient had apparently been well for over a month after a preceding depression of three years' duration, when a manic excitement ensued which resulted in hospitalization. Of the remaining patients, 7 showed definite evidence of having had alternating periods of depressive and elated mood which extended back over considerable periods ranging from two to twenty-one years.

It is well known that environmental situations and physical illnesses, to which the patients' relatives attach much etiological importance in giving the history, frequently cannot be substantiated as having been even precipitating factors of the patients' illness. However, a study was made of such factors. Four of the entire group at the onset of the attack for which they were first admitted had been worried over their work and economic security. In addition, one man had become depressed after selling a house which he had built for his home. Another man had become depressed after losing a considerable amount of money at about the same time that his only surviving brother became seriously ill. Two patients, one concerned over insomnia and the other upset by a chronic dermatitis, had taken considerable sedative medication. These were the 2 patients in whom evidences of delirium were associated with those of manic excitement. Two patients had manic attacks, and another a depression almost immediately following physical illness. Three patients had been worried over less apparently related or manifest physical disturbances (one over ill-fitting dentures and a possible miscarriage, another over the discomfort produced by arthritis, and the third over gastric distress) for some time before the personality disorder appeared. One of these patients, in addition, was concerned over the illnesses of her children. Another patient had been worried and indecisive over securing a divorce before she became depressed, and another became elated shortly after being disappointed over the defeat of a presidential candidate. In the remaining 9, there were no known situational or physical factors that could be related to these individuals' becoming ill.

Because of the average age of the group, it was regarded as important to evaluate the physical changes and factors which are commonly found during this later life period. Over one-half of the 25 patients showed evidence of some degree of arteriosclerosis. Thirteen patients had sclerotic changes in the retinal vessels, and 5 of these had an elevated blood pressure. Two of this same group were found to have albuminuria without associated elevation of the blood urea nitrogen. One patient, with evidence of arteriosclerosis, an elevated blood pressure and albuminuria, had definite cardiac enlargement. Another had a well compensated cardiac valvular lesion. In addition to these rather common physical findings, 4 patients showed arthritic changes (1 in the cervical spine and 3 in the interphalangeal joints). Seven patients at the time of admission showed definite nutritional disturbances with loss of weight being a prominent feature.

Of the 18 female patients, 7, averaging 44 years of age, were still having menstrual periods at the time of admission. Two were having irregular periods. Ten patients had passed through the menopause. Of these, one had had a surgical menopause at 45. The average age of the others was approximately 47 years at the time of the menopause. One patient with rudimentary pelvic organs had never menstruated. Other gynecological findings were senile changes in pelvic organs, poorly developed breasts, and a mastectomy for malignancy.

An analysis of the personality studies showed a variety of characteristics, but certain of these appeared to predominate. Over one-half of the patients were characterized as cheerful, outgoing, active and energetic people having fairly wide ranges of interests. About the same number were described as being very conscientious, quite sensitive to criticism, and having high ethical and moral standards. Fifteen patients showed an above-average degree of concern with bodily functions, 8 of this number having devoted much attention to the functioning of their gastro-intestinal tracts. For the most part, the information regarding the sexual histories was not unusual. Five of the married patients were noted as having some degree of sexual maladjustment, while 4 unmarried women seemed to have lacked heterosexual interest.

Considering the recognized high incidence of personality disorders in the heredity of patients having manic-depressive illness, the patients' family histories revealed rather significant findings. Eighteen patients (12 women and 6 men) had positive family histories of psychoses, and a majority of these were later life depressions. A maternal aunt of one female patient was subject to recurring depressions and elations during the fifth decade of life. A total of 35 instances of psychoses were noted in the entire group's family histories. These occurred in 5 fathers, 6 mothers, 5 grandparents, 5 collateral relatives, 13 siblings, and the daughter of one patient. Four of these individuals were known to have committed suicide.

In studying the hospital residence and subsequent course, it was found that there was considerable variation in the duration of hospital stay, the shortest period being eleven days and the longest two hundred and fifty-nine days. If 3 patients, each of whom was in the hospital over two hundred days, were omitted from the group, the average period of residence for the remaining 22 patients would be exactly three months. It is interesting that before discharge 12 patients showed a change in their original mood disorder by going to the opposite type of affective disturbance. In many this change occurred during a relatively brief period of time. In 8, of this group of 12, the depressive mood had changed to the elated mood associated with a manic or hypomanic state. In the remaining 4 the elated mood of a manic state had changed to a depressive mood before the patient left the hospital. It has been possible to check closely the course subsequent to discharge in 15 patients. Ten of this number had been hospitalized again, one patient on two occasions. The period of time preceding readmission varies considerably; one patient remained out of a hospital two months; another seven years.

In attempting to draw conclusions from this study it is necessary to point out that the relatively small number of patients studied does not justify dogmatic or even very definite conclusions. However, several interesting features seem to be noteworthy. The psychoses first appearing in middle age or later life are for the most part the type of depressions referred to as the melancholias, or the so-called organic reaction types. But the fact that 25 patients, having their first attack of manic-depressive illness in later life, could be selected from a relatively small group, suggests that this type of disorder is not uncommon. If one considered the age group alone, it would be natural to assume that the clinical pictures presented would include features characteristic of the psychoses related to aging. However, as the diagnosis indicates, the clinical pictures were essentially affective in nature with relatively few complicating factors incident to the life period.

The mood reactions of the patients were either those characteristic of depressions or of elations. In some there was slowing of thought and action that may go with depression, and in others the acceleration that goes with elation. The content of thought was quite characteristically in harmony with the

mood. Those patients who showed some resemblance to the so-called melancholias of the later life period did not have the bizarre preoccupations or somatic delusions that are seen in the melancholias of prolonged course and grave prognosis. Also, in this connection, it is of interest that anxiety was not frequently manifested. A certain number of patients had what might be designated as depressions with agitation. These patients when considered from the standpoint of their personality make-up, psychopathology, and the subsequent course of illness, appeared to belong to the manic-depressive reaction type. Some clinicians would probably designate these reactions as mixed types.

An attempt was made to evaluate the precipitating factors of illness. For the most part the findings here suggested a close relationship to the reality problems common to this period of life, such as actual or threatened financial or economic loss, and threats of the loss of close relatives through illness. Another important factor appeared to be the threatened or actual reduction in physical effectiveness by reason of physical illness occurring in the setting of increasing age. However, the total group showed, as so often is found in manic-depressive disorders, no outstanding precipitating factors.

Although, as already noted, the clinical pictures of the psychoses had no characteristic relation to the patients' somatic structures, it cannot be disregarded that the patients showed evidence of somatic disturbances, with evidences of arteriosclerotic changes affecting the brain and other organs being the significant findings.

In evaluating the etiological significance of changes in menstrual function in female patients, it appeared that such changes had their chief importance in relation to the patients' first attacks of affective illness. The individual's psychological attitude towards the menopause appeared to be the most significant factor.

The personality organizations of the patients seemed to be consistent with the general type of personality make-up that has been described as frequently found in manic-depressive cases. Outgoing, energetic qualities, and for the most part a cheerful mood predominated. However, there was an appreciably large number who were described as very conscientious, quite sensitive to criticism, and having high ethical and moral standards. In these latter features they showed some similarity to the prepsychotic personality patterns that have been described for involutional melancholia(1).

The incidence of major personality disorders in the family backgrounds appeared quite impressively high considering the relatively small group of patients studied. However, this is confirmed by the observations of Kraepelin(2) that a hereditary taint can be demonstrated in 80 per cent of manic-depressive cases. It is of interest that the predominant type of illness was a depression occurring in later life. This suggests an important hereditary tendency in some of these patients, and is of a somewhat specific type in that it becomes manifest in affective illness occurring in later life.

In considering the treatment problems presented by these later life manic-depressive reactions, the hereditary factors engender an attitude of pessimism. Without minimizing the significance of these ingrained tendencies, leads for treatment should be sought in studying dynamic factors which may be susceptible to constructive modification. Such factors are personality features and life situations. They should be evaluated from the standpoint of their particular significance in this group of older patients. Studies of the psychology of aging show that many older individuals have difficulty in adjusting to changes in environment and in meeting and managing threats to their social, economic and physical security. Their attitudes have become rather fixed, and their personality features are less susceptible to change. This indicates that such personality features as overconscientiousness and insistence on high ethical standards that some of the patients showed, will be difficult to modify. Nevertheless, it would seem that in attempting to prevent or modify future attacks of illness, therapeutic attention should be directed to assisting such patients in achieving more pliant attitudes. In female patients the relation of first attacks of illness to the menopause indicates that the psychological and physical aspects of this period in woman's life deserved careful attention and

management. The above-average concern with bodily functions displayed by several patients, together with the definite somatic pathology found in others, indicates the importance of carefully integrating and evaluating the psychological and physical aspects of each individual patient in planning and carrying out treatment.

As to prognosis, it would seem that patients first showing manic-depressive illness in the later life period are less likely in some instances to recover completely from an attack, or if recovering are liable to have a subsequent attack within a relatively short period of time. Also, there appears to be a tendency to go from one phase to another of the manic-depressive illness, and in some with only a short interval of health between the phases. This type of phasic manic-depressive illness is generally regarded as having a grave prognosis for ultimate recovery in the sense of permanent freedom from attacks. This gives a definite aspect of chronicity to the clinical picture of the manic-depressive illnesses of the later life period.

## BIBLIOGRAPHY

1. Titley, W. B. Prepsychotic personality of patients with involutional melancholia. Arch. Neur. and Psychiat., **36**: 19, 1936.

2. Kraepelin, Emil: Manic-depressive insanity and paranoia. Translated by R. Mary Barclay from the Eighth German Edition of the "Text book of psychiatry," p. 165. E. and S. Livingstone, Edinburgh, 1921.

# SCHILDER'S DISEASE IN ERGOTAMINE INTOXICATION[1]

By GEORGE A. JERVIS, M.D.

*Thiells, N. Y.*

AND

J. A. KINDWALL, M.D.

*Hartford, Conn.*

Although much has been written concerning the clinical and pathologic aspects of Schilder's disease (encephalitis periaxialis diffusa, "diffuse sclerosis") little is known about its causation. To be sure, various exogenous agents have been repeatedly mentioned in the evaluation of pathogenic factors operating in non-familial cases. Thus, Bielschowsky (1) and Schaltenbrand (2) have stressed the importance of infections, while other investigators (Globus and Strauss (3), Meyer and Tennent (4)) have taken into consideration toxic agents, possibly of intestinal origin. More recently the rôle of avitaminosis has been suggested (Einarson and Neel (5)). However, little factual material has been brought forward in favor of any of these hypotheses.

It is the purpose of this note to put on record a case of non-familial encephalitis periaxialis diffusa, occurring in a male adult, who over a long period of time had received very high doses of ergotamine. Although direct evidence that the toxic substance was responsible for the pathologic process obviously cannot be obtained, the time relation between intoxication and brain disease was so evident as to suggest a possible casual relation of the ergotamine poisoning to the demyelinating process. The publication of this case appears justified not only because of the controversial rôle attributed to toxic agencies in the etiology of diffuse sclerosis but also in view of the scarcity of actual information concerning the toxic action of ergotamine on the nervous system.

## Case Report

The patient (R. G. W.) a white male aged 48, was admitted to Clifton Springs Sanitarium October 21, 1938, with the diagnosis of ergotamine poisoning. The family history was negative, no member of the family being affected with nervous or mental diseases. The past personal history showed nothing of significance. The patient, a very successful obstetrician, had suffered from migraine almost all his life. About six years prior to admission, the attacks of migraine became more frequent and more serious, being accompanied some times by prolonged vomiting. At this time he began to take codein and other sedatives, including barbital, pantopon, scopolamin, in gradually increasing amounts. In 1934, he was started on ergotamine therapy. This drug was apparently successful in aborting the attacks when taken intravenously, and the patient made excessive use of it. Although an exact record was lacking, it was estimated that during the last two years he had received some 2-3 injections weekly. The amount of each dose could not be established but it was known that the usual dosage being insufficient to bring about relief, he would often use higher doses, up to 5 and 6 cc.

In 1935, he suffered an attack of severe diarrhea which was very exhausting. Similar attacks recurred off and on, without apparent cause.

During the past six months the patient's wife had noticed that his memory for recent events occasionally showed some defects. Moreover, some personality change had occurred: the patient, in fact, had begun to swear, a thing he had never done before, and had become asocial. However, he had continued his practice and no one had noticed anything unusual in his work.

On October 3, while he was conducting a delivery at night, he received 6½ cc. (3.25 mg.) of ergotamine tartrate intravenously. He complained that his vision was poor, and after the delivery was finished, he lay down to rest in the doctors' room. He was found there at 10 o'clock the next morning in coma. He was cyanotic, respirations were 5-6 per minute, the pulse was not palpable; B.P. was 45-50/0. The pupils were constricted and did not react to light. There was complete areflexia. The coma lasted several hours. After a short period in a local hospital, he was admitted to the Clifton Springs Sanitarium, October 21, 1938.

On admission, the patient had a rather expressionless face, but at times smiled appropriately and, on one occasion, laughed silently for a moment at some sally by the physician. He would move very

[1] From the Research Department, Letchworth Village, Theills, N. Y.

little spontaneously, and had to be urged or almost pushed into a standing or sitting position. He said nothing spontaneously; he answered very briefly to questions, but answered appropriately and gave evidence, by his manner, of understanding what was said. When presented with a paper, he appeared to be able to read what was printed on it, and was able to sign his name in a correct manner. There was no evidence of hallucinations or delusions. The outstanding characteristic of the mental status was his lack of psychomotor activity.

Laboratory examinations including urine analysis, blood counts, spinal fluid examination and Wassermann reaction were normal.

The neurological and mental status changed rapidly. The day following admission the patient appeared confused; he would stand as in a daze and seemed not to know what to do. He defecated on the rug, and showed no sign of interest when interviewed by old friends. The confusional state increased the following day and neurological signs were observed consisting of a slight flattening of the left lower face and a sign of Oppenheim to the left. On October 24, a general increase of tonus of legs and arms was observed. There was also a left Babinski. The gait was unsteady with some sliding, especially on the left foot. The mental confusion persisted. On October 25, he was bedridden, lying almost motionless. The extensor reflexes of the toes were very striking; there was also a slight tendency to flexion of the legs. There was definitely increased tonus in all the limbs. The left arm, however, was not as hypertonic, apparently because of an old neuritis. The deep reflexes were all increased except in the left arm. He was incontinent of urine and feces. On October 29, hypertonicity of the limbs had increased and the hands had assumed the tetany position, *i.e.*, slight pronation of the forearm, flexion at the elbows, flexion of the first phalanges of the fingers, and extension of the second and third phalanges. There was a definite tendency to grasp reflex. Tremor had appeared, especially in the left side. On November 3, he had a slight convulsion predominantly on the left side. His condition became progressively worse, the neurological picture being about the same, although the spastic symptoms had increased. Muscle spasms were very frequent. On November 9, temperature increased and three days later death occurred, preceded by Cheyne-Stokes respiration and symptoms of circulatory collapse.

Gross and histologic examination of the viscera, performed by Dr. W. S. Thomas, showed no significant lesions.

### Examination of the Brain

On external gross examination, the brain showed no pathological alterations. The gyrification was rich and showed no deviation from the normal. The brain was cut coronally; some discoloration and a slightly diminished consistency of the white matter was noted macroscopically in the unstained sections of the frontal lobe.

Microscopical examination followed usual procedure. Large sections of the hemisphere, including the whole single lobes, the basal ganglia and the cerebellum were stained with the Weigert method for myelin. Consecutive frozen sections from smaller blocks representing the various regions were stained with the Spielmeyer method for myelin, scarlet R for fat, and the Holzer stain for glia. Similar blocks were embedded in celloidin and paraffin and the sections studied with the Nissl and Einarson methods for neuron cells. Stains for neurofibrils were used on both frozen and embedded sections. The macroglia and microglia were studied with the Cajal and Hortega impregnations. The Mallory anilin blue and the Masson stains were also employed. Finally, various methods for lipoid substances were used for the study of the products of degeneration.

The main pathologic feature consisted of destruction of myelin sheathes. Large coronal sections including the whole hemisphere, showed the distribution of this pathology. The demyelination was very intense in the frontal, parietal and anterior part of the temporal lobes, reaching its maximum intensity in the pre-frontal region, and gradually decreased in the posterior part of the temporal lobe and in the occipital lobe (compare Fig. 1a with Fig. 1b). The areas of demyelination were roughly symmetrical in the two hemispheres. The subsulcine fibers were well preserved throughout, standing out against the demyelinated part of the white matter in a characteristic fashion well illustrated in Fig. 1. At high power, it was seen that the demyelinating process was incomplete. Even in the areas of major destruction, numerous myelin sheathes were still present, showing alterations of contour, irregular swellings and paleness of color. In less altered areas, patches of more or less preserved myelin fibers were observed scattered without order and resulting in a peculiar aspect recalling the "Landkartenherde" of the German authors (Fig. 2). Concentric formations as described by Balo (6) were never seen nor was there any relationship of preserved myelin to blood vessels. The demyelination process showed no predilection for the periventricular areas. Throughout the diseased areas Weigert and Spielmeyer preparations showed a large amount of fragments of myelin which were at times dustlike, at other times balloonlike in appearance. In the better preserved areas many peculiar formations closely resembling the "grapelike zone of degeneration," described by Buscaino (7) in the brains of patients affected by dementia præcox, were seen in sections in which the myelin stain was used on alcohol fixed material (Fig. 3).

The demyelinating process was confined to the white matter of the centrum semiovale. The myelin sheathes of the capsula interna and externa appeared well preserved. Only in the capsula extrema was there some initial demyelination. The fibers of the corpus striatum contained normal myelin and those of the thalamic nuclei were also normal. Cross sections throughout the cerebral pedunculi, pons, medulla and spinal cord, stained with Spiel-

meyer's method, showed neither systemic nor patchy demyelination. The cerebellum was also normal in the myelin preparations; however, in a few areas of the medullary center, the myelin sheaths appeared paler than those of adjacent areas and, at high power, irregularity of the contour of the sheathes and some fragmentation could be observed.

In Bielschowsky and Bodian preparations the axis cylinders within the demyelinated areas appeared well preserved as far as their number was concerned, although this was based only on rough estimate, no precise method of counting the axons having been attempted. Only in the prefrontal areas was there apparent some diminution in the number of axis cylinders. In these regions the myelin sheathes were completely destroyed.

In conclusion, there was evident everywhere a clear-cut contrast between the damaged myelin and the relatively well-preserved axis cylinders. High-power examination of the silver preparations of the damaged areas showed, however, varying alterations of the single axis cylinders. These consisted of circumscribed swellings, irregularities of contour, corkscrew appearance and similar features.

Cellular stains, including Nissl, Einarson, Mallory and Masson stains and the Cajal and Hortega impregnation showed that the demyelinated areas contained a large number of cells of which various types could be identified. The bulk of the cellular elements in the severely demyelinated areas exhibited the characteristic features of granular compound corpuscles (Fig. 4), showing in the Nissl and Mallory stains, large, reticulated and clear cytoplasm and small eccentric nucleus. Frequently one or two large vacuoles were seen within the cytoplasm. In preparations for fatty substances the reticulated cytoplasm of these cells was filled with lipoid granules which stained bright red with scarlet R and sudan III, black with osmic acid, deep black with sudan black. This fatty material was promptly dissolved by acetone, ether, chloroform or xylol. With Hortega's silver impregnation, these scavenging cells were clearly brought out and the same sections counter-stained with fat (Fig. 5), showed numerous transitional elements between hypertrophic and hyperplastic microgliacytes and scavenging cells.

A second type of cellular elements found in large numbers within the damaged areas consisted of large glia cells, exhibiting abundant cytoplasm which stained uniformly deep blue in the Mallory preparation, and an eccentric nucleus containing dark chromatin granules. With the Nissl method these cells showed usually no dendrites but in the anilin blue and the light green preparations a few short dendrites were clearly seen. Likewise, in the Cajal gold impregnation (Fig. 6) where they appeared as plump elements, short dendrites were present. When stained with scarlet R or osmic acid, in no instance was fatty material found in the cytoplasm of these large glia cells.

Besides these two main types of cells other elements were seen in the damaged areas. These included (a) oligodendroglia cells which appeared roughly normal in number. In the Hortega preparation the majority of oligodendrogliacytes showed the characteristic features of acute swelling; this alteration was not limited, however, to the areas of demyelination but extended also to the regions of apparently normal tissue. (b) Hypertrophic astrocytes of the fibrillary type exhibiting numerous and long dendrites which were brought out specially well in the Holzer preparation. These cells were rare and were seen only in certain areas. In the sections stained with the Holzer method, it could be observed that the demyelinated areas contained a very loose network of glia fibrils.

It should be noted that in no section were so-called prelipoid substances found. This material, the importance of which has been stressed by Scholz (8), and others, stains pale rose with scarlet R and black with hematoxylin; it is, moreover, of slow solubility in acetone and ether while, in the present case, prompt solution was observed. Likewise, the metachromatic material recently found by Einarson and Neel (5) and by Bogaert and Dewulf (9) in cases of diffuse sclerosis was nowhere observed.

The blood vessels within the demyelinated areas were the object of careful examination. In many instances there was moderate engorgement of the vessels, specially the small veins, but hemorrhages were not seen. The lumina of the vessel contained no thrombi. The vessel walls were everywhere normal. The perivascular space was occasionally dilated and contained what appeared to be coagulated fluid but in no place was there observed perivascular infiltration with hematogenous elements such as lymphocytes, plasma cells and leukocytes. Even in the areas of greatest myelin destruction there was no perivascular cuffing of scavenging cells but only a few isolated gitter cells were seen in the adventitial space. In a word, the blood vessels showed no significant changes.

Examination of the central nervous system outside the demyelinated areas showed little of significance. The main cyto-architectural fields of the cerebral cortex were studied with the Nissl method; the normal laminar arrangement of the neuron cells was everywhere well preserved. Particular attention was paid to the presence of indirect histological evidence of vasomotor disturbances such as circumscribed area of "dropping out" of cortical cells, destruction of the lamina pyramidalis of the Ammon's horn, shrub-like proliferation of glia in the molecular layer of the cerebellum; but no such features could be found. The neuron cells of the cortex, especially the large pyramidal cells, contain often a yellowish pigment which was insoluble in xylol. Large amounts of the same type of pigment were to be seen in the neuron cells of the dentate nuclei of the cerebellum and of the inferior olives. The latter appeared distended by the accumulation of pigment; the cellular nuclei though eccentrically located were normal in structure. The neuron cells of the corpus striatum, thalamus, hypothalamus, red nucleus

and the nuclei of the encephalic nerves appeared normal. In the cerebellum, the only alteration to be seen in the Nissl preparation was a slight dropping out of Purkinje cells.

The glia outside the demyelinated areas showed no alteration beyond a widespread acute swelling of the oligodendroglia. Likewise, the blood vessels were morphologically intact.

## Comment

Although the clinical picture of the patient showed little of a specific character, the symptoms and signs obviously indicated a severe reaction of the central nervous system, organic in character. Based on the history of ergotamine addiction, a diagnosis of ergot poisoning was tentatively made. That the patient had taken excessive amounts of the drug was beyond doubt. According to Storch (10), when administered by the intravenous route, no more than one dose of 0.5 mg. (0.5 cc) of ergotamine should be given in 24 h., nor more than two such injections in any one week, and continuance should not be at a rate greater than 0.5 mg. a week. Yet the patient had a single verified dose of 3.25 mg. (6½ cc) or over six times the maximum dose and there was every reason to believe that similar high intravenous amounts of the drug were administered frequently.

To be sure, some clinical features appeared to confirm the diagnosis of ergot poisoning. There is described in the medical literature a type of ergot intoxication exhibiting almost exclusively neurological and mental manifestations. This condition, which is termed convulsive ergotism (Barger (11)), or neurogenic ergotism (Storch (10)), is characterized by fatigue, restlessness, confusion, delirium, mental deterioration and, neurologically, by hypertonicity of the muscles of the limbs, clonic muscular twitching, tonic spasms, generalized convulsions. These symptoms and signs were present in the patient here described. Severe diarrhea, which is frequently reported in ergot intoxication, was repeatedly noted in the present case; thorough clinical and laboratory examinations failed to demonstrate factors other than ergotamine in the causation of these severe attacks of diarrhea. Signs of involvement of the peripheral vessels such as livid, cold skin over the extremities, lack of peripheral pulses, and gangrene, which are usually thought of as characteristic manifestations of severe ergotism, were absent. It should be noted, however, that these manifestations occur in the gangrenous type of ergotism, not being seen in the purely convulsive type (Barger (11)).

The pathologic examination of the central nervous system leaves no doubt as to the diagnosis of Schilder's disease (encephalitis periaxialis diffusa, "diffuse sclerosis"). The outstanding alteration was, in fact, a demyelination extending bilaterally to the whole centrum semiovale; the subsulcine fibers were relatively spared; the axis cylinders appeared not involved, or slightly so, by the pathologic process; the glia had proliferated within the demyelinated areas, giving rise to hypertrophic macroglia and to numerous scavenging cells loaded with fat, and finally, the gray matter showed no significant pathologic changes.

Although the criteria of classification of "diffuse sclerosis" in various pathologic types are still a matter of considerable doubt, it seems of interest to attempt to establish some pathologic characteristics of the case here reported. The demyelinating process was, first, in an acute stage as evidenced by large amounts of fatty substances and by the almost complete absence of fibrillary macroglia. The term "sclerosis," therefore, will hardly fit the pathologic picture. The clinical course, which was extremely rapid, confirms the acute character of the process. One should classify this case, therefore, as acute Schilder's disease. According to a widely accepted classification, two types of "diffuse sclerosis" are recognized: the inflammatory and the degenerative type, the main diagnostic criterion being the presence in the former and the absence in the latter of marked perivascular infiltration with hematogenous cells. Without discussing the debatable value of this classification, it will be noted that the present case belongs undoubtedly to the degenerative type, since nowhere were perivascular infiltrations to be found. Following another well-known classification one may distinguish between familial and sporadic types of "diffuse sclerosis," the former probably endogenous, the latter possibly exogenous in nature. Although the

familial character is often an unreliable criterion and cases described as sporadic appeared on later scrutiny to be familial in nature (Meyer (12)), there are pathologic features which seem to give value to this classification. In fact, in the familial type, Scholz (8), and others, have stressed the presence of products of incomplete destruction of myelin, appearing as granules which stain blue with hematoxylin and mat rose with scarlet R (so-called "pre-lipoids"). No such granules were observed in the present cases, all the products of myelin degeneration being equally stained brightly red with scarlet R and sudan III. These findings appeared to confirm, therefore, the non-familial character of the disease, as shown by the family history. Altogether, this case should be classified as an *"acute, degenerative, non-familial* type of encephalitis periaxialis diffusa."

In the attempt to evaluate the various agents which may play a rôle in the causation of "diffuse sclerosis" two orders of factors are usually taken into consideration, exogenous and endogenous in nature. It appears reasonable to assume that in the familial types, endogenous factors play a preponderant rôle, and there is some evidence suggesting that a genetically determined local metabolic disturbance of the lipoid metabolism or some congenital insufficiency of the glia is at the basis of the pathologic process. However, in acute non-familial types, as the one here described, no evidence in favor of an endogenous condition has been offered, while there is good reason to believe that toxic agents may be responsible for the demyelinating process. As a matter of fact, damage of myelin sheathes has been obtained experimentally with a variety of toxic substances including tetanus toxin (Claude (13), Boumann (14), Putnam *et al* (15)); vinilamine (Luzzato and Levi (16); potassium cyanide (Ferraro (17), Hurst (18)); carbon monoxide (Hiller (19), Grinker (20), Altschul (21), Meyer (22), Hilper (23)).

There is, therefore, some justification in assuming that ergotamine might have played a rôle in the causation of the demyelinating process in the present case. This once assumed, one may speculate on the mechanisms of the pathologic action of the drug. That ergotamine acted through circulatory disturbances seems improbable. Similar mechanisms may be assumed in the demyelination following CO intoxication. In the present case no evidence of circulatory disturbances was found; in fact, the blood vessels were intact, and no circumscribed dropping out of the nerve cells was observed in the cerebral cortex, nor any other histologic features which are usually connected with vascular changes, either morphologic or functional in character. Moreover, the demyelinating process appeared to bear no topographic relation to blood vessels. A direct toxic action of ergotamine on the myelin sheathes seems a more reasonable hypothesis. That some toxic action of ergot on the brain does take place is evidenced by the condition known as "convulsive ergotism" already referred to. Unfortunately, the brain pathology of this disease has never been adequately studied, although the type and violence of the clinical symptoms seem to indicate widespread and severe brain changes. Experimentally, much work has been done on the action of ergotamine on the circulatory and other systems but little is known concerning the toxic action of this drug on the nervous system, although Tinel (24) recorded the occurrence of convulsions.

The possible rôle of vitamin deficiency in the hypersensitivity of the nervous system to ergot should be mentioned. Experimental evidence for this has been offered by Mellanby (25) who demonstrated that when ergot was given to animals which were kept on a diet deprived of vitamin A myelin degeneration was present in the spinal cord while no pathologic changes took place in either ergot intoxication or vitamin A depletion alone. Unfortunately, examination of the brain is not mentioned in Mellanby's work. From the clinical point of view, Storch (10) observed that accessory symptoms following the use of ergotamine appeared to be much more severe in patients in whom vitamin C deficiency was chemically demonstrable, than in the remaining patients. It may be, finally, added that the so-called epidemics of convulsive ergotism recorded in the literature occurred in times of famine when vitamin depletion was certainly present. The possibility of vitamin deficiency in the

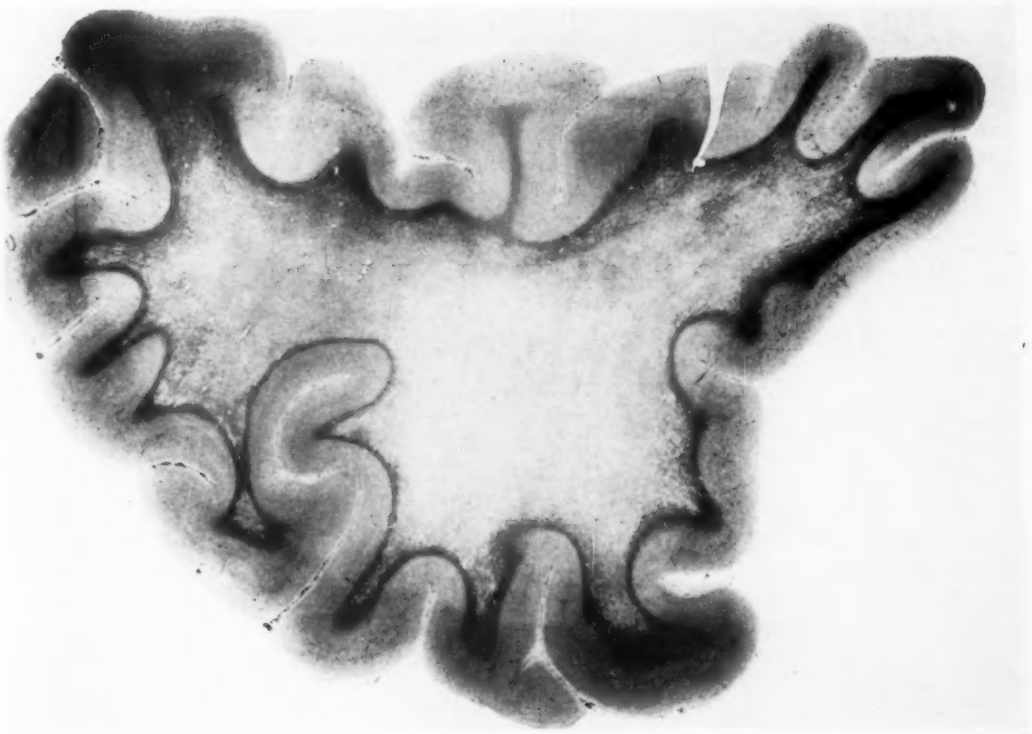

FIG. 1A.—Coronal section through the frontal lobe. Weil's stain for myelin.

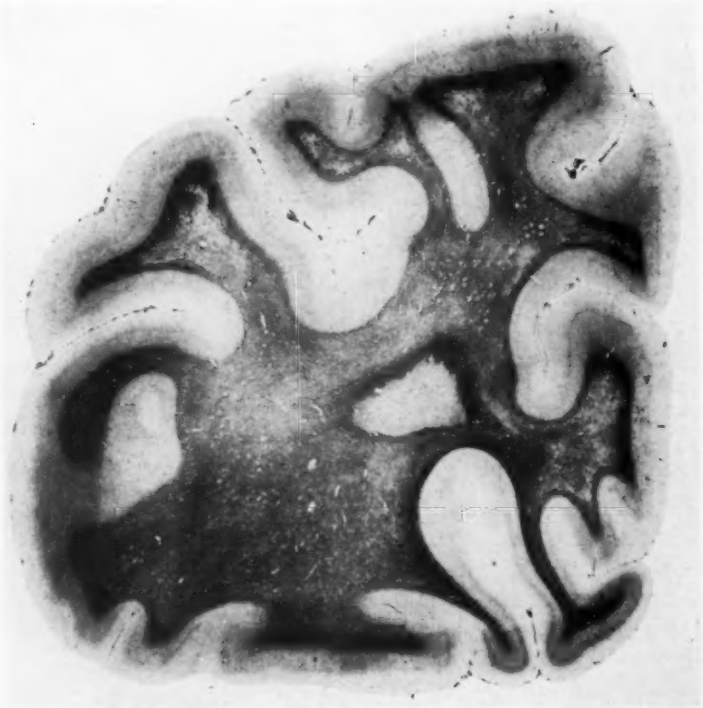

FIG. 1B.—Coronal section through the occipital lobe. Weil's stain for myelin.

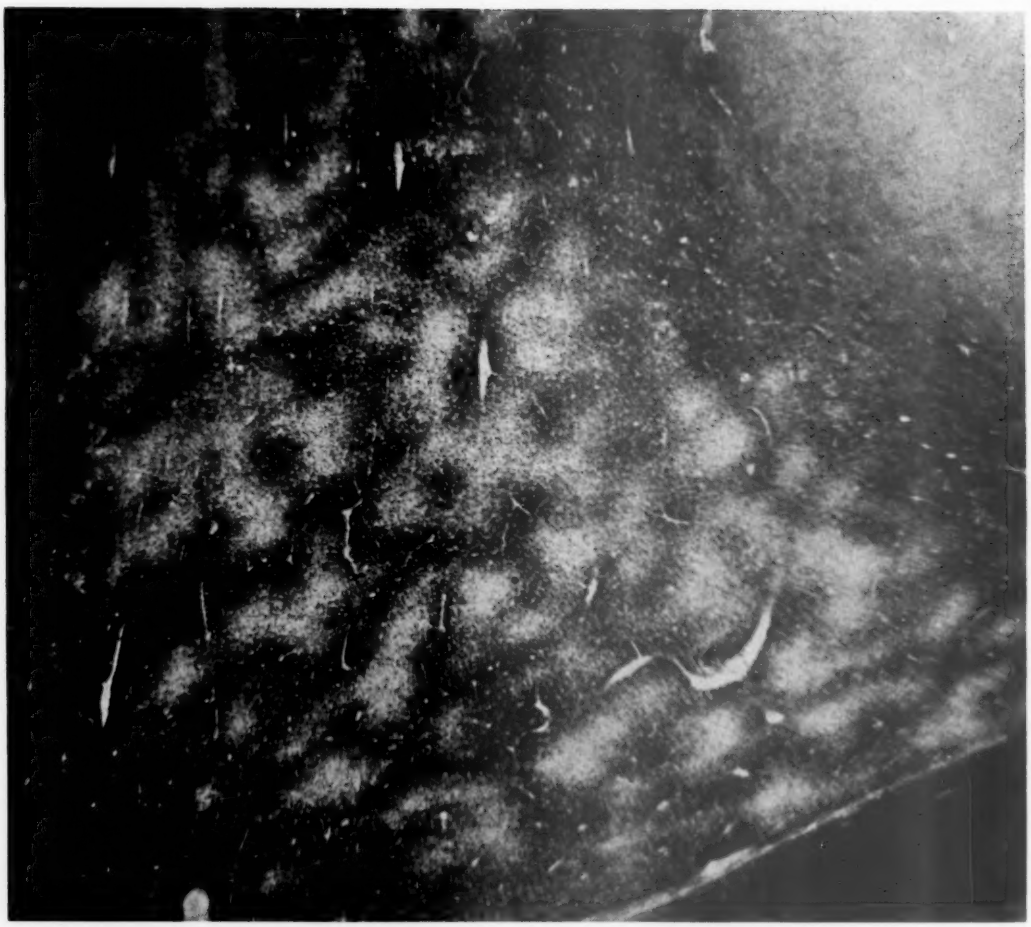

FIG. 2.—Characteristic aspects of partial demyelination in the temporal lobe. Spielmeyer's stain for myelin. Low power.

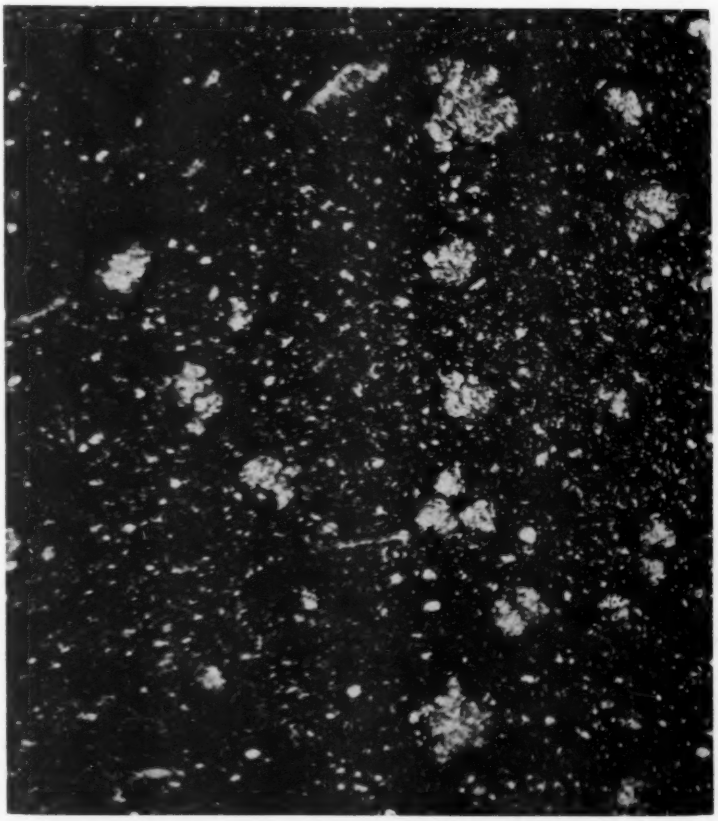

FIG. 3.—So-called areas of grapelike disintegration. Spielmeyer's stain. Low power.

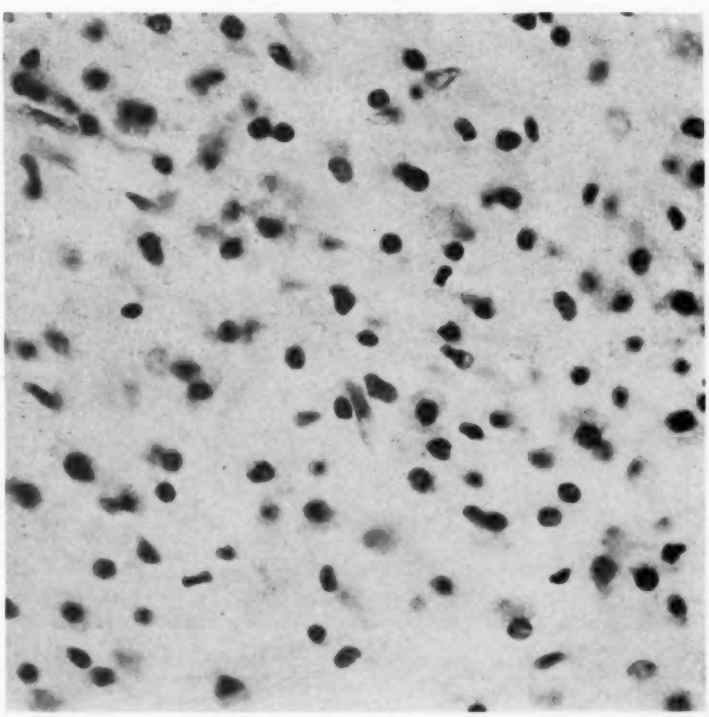

FIG. 4.—Illustrating the cellular content of the demyelinated areas in the Nissl preparation. Medium power.

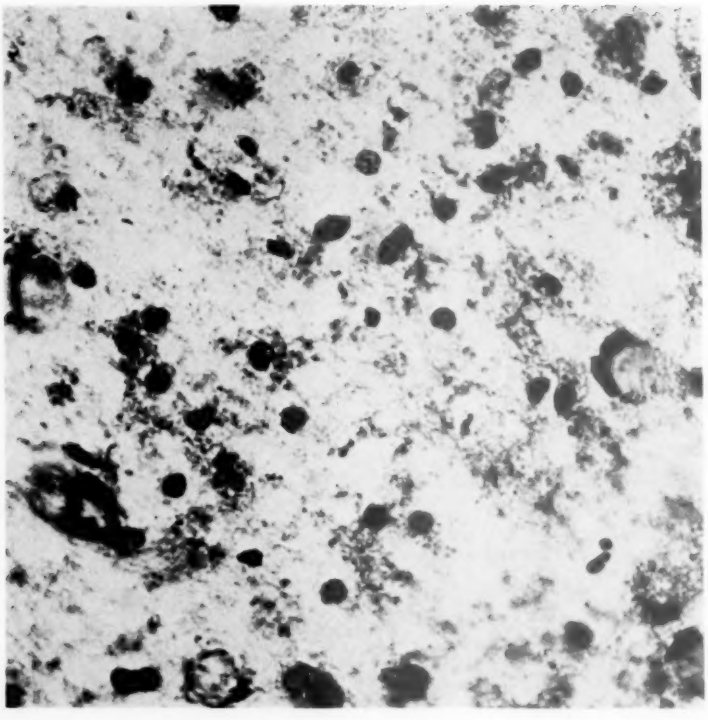

FIG. 5.—Scavenging cells in the Hortega's preparation counterstained with Scarlet R. High power.

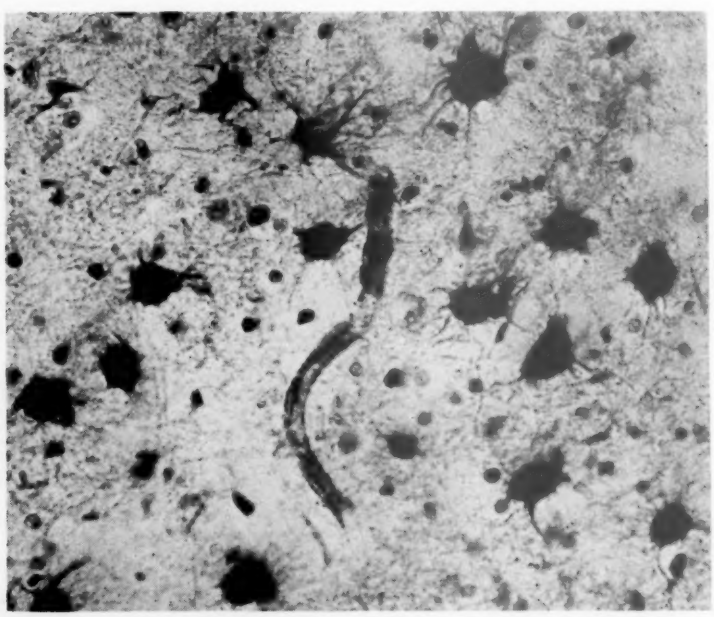

FIG. 6.—Hypertrophic glia cells with scanty dendrites in the demyelinated areas. Cajal's gold-sublimate impregnation. High power.

patient here reported, should be kept in mind. In fact, his eating habits were reported to have been very irregular and inadequate, and for a number of years, he was afflicted with attacks of severe and exhausting diarrhea. Bean and Spies (26) have recently called attention to the fact that diarrhea predisposes to the development of deficiency syndromes by causing increased loss or decreased absorption of vitamins.

## Summary

The case is reported of an adult male patient, who, in the course of prolonged use of excessive doses of ergotamine given by the intravenous route, developed a severe condition characterized by profound mental confusion and tonic and clonic spasms, and terminating rapidly in death. Post mortem, there was the characteristic picture of acute Schilder's disease. The possible relation of the ergotamine intoxication to the demyelinating process is taken into consideration and briefly discussed.

## BIBLIOGRAPHY

1. Bielschowsky, M.: Die Bedeutung der Infektes für die diffuse Sklerose. J. Psychol. Neurol., **33**: 12, 1937.

2. Schaltenbrand, G.: Encephalitis periaxialis diffusa (Schilder). A case report with clinical and anatomic studies. Arch. Neurol. Psychiat., **18**: 944, 1927.

3. Globus, H. J., and Strauss, I: Progressive degenerative subcortical encephalopathy. Arch. Neurol. Psychiat., **20**: 1190, 1928.

4. Meyer, A., and Tennent, T.: Familial Schilder's disease. Brain, **59**: 100, 1936.

5. Einarson, L., and Neel, A. V.: Beitrag zur Kenntnis sklerosierender Entmarkung prozesse im Gehirn. Munksgaard Kopenhagen, 1938.

6. Balo, J.: Encephalitis periaxialis concentrica. Arch. Neurol. Psychiat., **19**: 242, 1928.

7. Buscaino, V. M.: Istologia dell'encefalo di dementii precoc zolle di disintegrazione a grappolo. Riv. di. pat. nerv. e. ment., **39**: 342, 1932.

8. Scholz, W.: Uber Wesen, nosologische und pathogenetische Bedeutung der atypischen Abbauvorgänge bei den familiären Markerkrankungen. Mschr. Psychiat. Neurol., **86**: 111, 1933.

9. Bogaert, L. van, and Dewulf, A.: Diffuse progressive leukodystrophy in the adult. Arch. Neurol. Psychiat., **42**: 1083, 1939.

10. Storch, T. G. C. von: Complication following the use of ergotamine tartrate. J. Amer. Med. Assn., **111**: 293, 1938.

11. Barger, G.: Ergot and ergotism. London, Gurney and Jackson, 1931.

12. Meyer, A., and Pilkington, F.: Some problems of pathogenesis in Schilder's disease. J. Ment. Sci., **82**: 812, 1936.

13. Claude, H.: Myelite experimental subaigüe par intoxication tétanique. Arch. de Physiol. Norm. et Pathol., **29**: 843, 1897.

14. Boumann, L.: Hirnveränderungen bei Tetanus. Ztsch. f. ges. Neurol. u. Phychiat., **58**: 301, 1920.

15. Putnam, T. J., McKenna, J., and Morrison, L.: Studies in Multiple Sclerosis. J. Am. Med. Assn., **97**: 1591, 1931.

16. Luzzato, R., and Levi, A.: Lesioni disseminate del sistema nervoso nell'avvelenamento per una base grassa non satura. Arch. intern. de Pharamacodyn. et Therap., **26**: 341, 1922.

17. Ferraro, A.: Experimental toxic encephalopathy. Psychiat. Quart., **7**: 267, 1933.

18. Hurst, E. W.: Experimental demyelination of the central nervous system. I. The encephalopathy produced by potassium cyanide. Austral. J. Exp. Biol., **18**: 201, 1940.

19. Hiller, F.: Uber die krankhaften Veränderungen im Zentralnerven system nach Kohlenoxydvergiftung. Ztsch. f. ges. Neurol. u. Psychiat., **93**, 594, 1924.

20. Grinker, R. R.: Uber einen Fall von Leuchtgasvergiftung mit schwerer Degeneration des tiefen Grossmarklagers. Ztsch. f. ges. Neurol. u. Psychiat., **98**: 433, 1925.

21. Altschul, R.: Die Einwirkung der Kohlenoxydvergiftung auf das Zentralnervensystem. Ztsch. f. ges. Neurol. u. Psychiat., **111**: 442, 1927.

22. Meyer, A.: Experimentelle Erfahrungen über die CO. Vergiftung des Zentralnervensystems. Ztsch. f. ges. Neurol. u. Psychiat., **111**: 187, 1928.

23. Hilpert, P.: Kohlenoxydvergiftung und multiple Sklerose. Arch. f. Psychiat., **89**: 117, 1936.

24. Tinel, J., and Ungar, G.: Sensibilation des arteres cerebrales a l'action de l'adrenaline par injéction préalable d'ergotamine. Compt. Rend. Soc. de Biol., **112**: 758, 1933.

25. Mellanby, E.: The experimental production and prevention of degeneration in the spinal cord. Brain, **54**: 247, 1931.

26. Bean, W. B., and Spies, T. D.: Vitamin deficiencies in diarrheal states. J. Am. Med. Assn., **115**: 1078, 1940.

# THE MENTAL HOSPITAL AND THE COMMUNITY[1]

By M. A. TARUMIANZ, M. D., Farnhurst, Del.

At the present moment when democratic countries are using every effort to keep civilization from regressing, it is important that we strive not only to maintain the standards of our hospitals for mental diseases but also to elevate them until they compare favorably with those standards maintained by general hospitals, not alone in intramural but in extramural aspects as well. Too long the hospitals for mental diseases have been hospitals in name only, and it is time that the administrators and psychiatrists, as well as others, connected directly or indirectly with these institutions make additional effort to improve existing conditions. Too long we have depended on the veneer covering the crumbling walls of our structures to give us the appearance of being the real article. How can we expect the community to support us in transforming our "horse and buggy" institutions into "streamlined" hospitals unless we are frankly honest about the existing conditions. The veneer consists of the modern accepted drastic and radical methods of treatment. These are undoubtedly of great value and should be used by all institutions. They are dramatic and popular with the public. But what are we doing to improve the general aspects of the hospital? New discoveries in chemotherapy should encourage us, as psychiatrists, to continue our efforts to find new remedies and to improve, or change totally, conditions. The majority of thinking people feel that total war is the only means by which democracy can be victorious; so it is time that the majority of psychiatrists wage a total war against the nineteenth century methods of the care of the mentally ill, changing the concept of the people in regard to psychiatric hospitals. They still have too much of the aspect of houses of detention.

At the present time the modern state hospital can be divided into three definite sections, namely, that part which cares for the custodial cases, that section where active psychotic cases are treated, and an outpatient department. Each division presents its own problems. In order that custodial cases may maintain near average social levels within the institution drastic measures might successfully be used. In our hospital, we have found that patients who apparently were completely deteriorated and who often were kept in restraint, reacted to electric shock therapy in a manner which resulted in adequate ward and intramural social adjustment. Moreover, custodial cases must be assigned to various departments in the hospital for work therapy to give them an interest outside their own hallucinatory and delusional experiences. This must not consist in merely assigning a patient to some department, but his aptitudes and interests prior to the onset of the psychosis must be carefully studied if work therapy is to be successful; and, at the same time, adequate recreational facilities should be provided, so that the custodial cases live as nearly a normal existence as possible.

The active and convalescing service presents another problem. It is the duty of the psychiatrist to use all means possible to readjust the individual and to keep him from becoming a chronic case, who must remain in the hospital for the duration of his life. With the failure of psychotherapy more radical treatments must be carried on in preference to allowing the condition to become chronic. During the convalescing period the patient must be re-educated so that he can meet traumatic environmental factors without a return of a flight into abnormalcy. The average case for discharge should leave with a better understanding of his own mental mechanisms than he had previous to the onset of his psychosis.

The third division consists of extramural work. The ideal outpatient department is headed by a full time psychiatrist who is not burdened with hospital duties. The duties of this department consist mainly of the

[1] Read at the annual meeting of the Southern Psychiatric Association, Nashville, Tenn., Oct. 6, 1941.

treatment of individual cases who are not psychotic, but who are maladjusted, and who must be taught a better understanding of their own emotional reactions toward others in the community. At the same time, a certain number of cases are presented merely for diagnostic purposes. The psychiatrist in charge of an outpatient department must be familiar with endocrine and neurological conditions, as well as the rarer medical diseases which are often not recognized by the general practitioner since he is not in contact with them frequently. The duties of the outpatient department should also include group education and community lecturing. It should help in the training of teachers so that they may understand the signs of early emotional instability in children. For conducting effective preventive psychiatry—and by preventive we do not mean merely "getting along" in the community as one of a large group, but the producing of an individual who is effective in his work, who is happy and socially acceptable in all spheres, a man who can recognize his own defects and who is able to face his problems without rationalizing—much must still be done. The Delaware State Society for Mental Hygiene,[2] a branch of the National Committee for Mental Hygiene, is conducting classes in human relationships in public schools. These classes by means of short plays, moving pictures and stories combined with free discussion attempt to teach the child to live in any social group in which he might find himself and to meet any environmental problem in a logical and acceptable manner; in this way, preventing conflicts and eventual neuroses or psychoses in later life.

The problems of intramural work are difficult to solve and require thought with reorganization of the present system particularly in regard to employees. The available, satisfactory personnel for psychiatric hospital work is still far short of the demand. Moreover, to raise the standing of mental hospitals to that of general hospitals, it would be necessary to increase the personnel beyond the present required number. The public must realize that psychiatric institutions cannot be maintained in a scientific manner more cheaply than general hospitals. A minimum per capita rate of $3 a day is not an excessive amount if the patients are to receive the care necessary to produce a rapid cure. I am sure that all will recognize the fact that intensive therapy on three or four cases daily will produce rehabilitation much more rapidly than therapy given every other day, twice a week, once a week or even once a month which is often the policy to-day. Economically, this is a valuable procedure. From a humane viewpoint, it makes any other policy seem almost a matter of malpractice. But to obtain funds to maintain this necessary personnel to carry out adequate treatment still requires further education of the public. In order to obtain the desired result, the mechanism of the state hospital must be changed and more money spent or the taint of "asylum" will still remain. Even today, most of the care of the mentally ill is in the hands of untrained personnel. True, physicians are in charge, but they only see the patients for a very short period of time daily, the direct contact being carried on by attendants during day and night. In a few cases, graduate nurses will have supervisory power, but they are in charge of so many patients that it is impossible for them to give individual care except in a few selected cases. The attendants may be conscientious, but often through their conversation and behavior they may cause the patients' conflicts to become more fixed. It is often true that these employees, themselves, are suffering from a certain amount of maladjustment which prevents adequate understanding of the patients' difficulties. A short course, teaching them how to make beds and to care for the general mechanics of the ward, does not solve the problem, for they should also know the fundamentals of mental health and should realize the danger of careless conversation in regard to the patients' personal lives. Often, much needed time of the medical personnel is consumed in overcoming unwise but well meant contacts between attendants and patients. Larger hospitals, at least, should establish a training course to prepare men and women to care for psychotic patients in an intelligent

[2] Under the direction of Col. H. Edmund Bullis, executive secretary.

manner. Those admitted to such a course should be in good physical condition, should not suffer from other than minor emotional conflicts and should have at least normal intelligence. They should be made to feel that the care of the mentally ill is a profession, even as general nursing is a profession. They should at least have a high school education with a certain amount of cultural background so that they can compete with any patient who may be admitted. The minimum training course should be one year, preferably longer. The salary paid, of course, would vary with the economic situation in the country, but during the course of training, they should receive a minimum salary of $25 a month with room and board. The ages of acceptance for such training should be between 17 and 25, and it should be understood that at the end of the course of training and upon their graduation they must pass a state board examination even as nurses do at the present time. The standards of such schools should be under the control of The American Psychiatric Association and the examinations should be given by a competent board of psychiatrists. All high school students who show aptitude in this type of work should be encouraged to enter training by establishing better income for attendants as well as better living conditions. To obtain the highest type of personnel, the salary cannot be less than $75 a month with maintenance on starting, reaching a maximum of $125, and the hours must be shortened to eight so that adequate recreational facilities are obtainable. The present long hours spent with the mentally maladjusted individuals have caused the state hospitals to become a community differing from all others. Time for recreation is so limited that within the state hospital group there is found an abnormal interest in the personal affairs of patients as well as other employees, since no other adequate outlet is provided. Moreover, the undesirable living conditions, as well as the inadequate salary, often makes it necessary for the state hospital to employ individuals who are unable to adjust to other types of business, and at times to employ those who are actually mentally deficient. Often the patient himself is more capable of handling a situation than the attendant, and he has no confidence in being under the care of an individual who is unable to give him the proper understanding. Moreover, the medical staff is dependent on the report of the attendant as to the behavior of the patient. If this report is not adequate from a psychiatric viewpoint, the physician, himself, is handicapped in his therapeutic procedures and even may, at times, use the wrong technique in an individual case. Most of the attendants conceive of the problem as one of controllable behavior rather than the result of behavior resulting from emotional conflicts. We are living in a "streamlined" era and state hospitals must not allow themselves to become obsolete in spite of the fact that they are working under difficulties, particularly at the present time when it is a problem to obtain adequate personnel from staff physicians down to the man who works on the grounds, or the mechanic.

It is still the rare physician on a state hospital staff who has the initiative to carry on research work in spite of the wealth of material which such institutions offer, a greater wealth than any general hospital. To attract the physician who has an exploring type of mind and who can add to the general knowledge of psychiatry, salaries must be equal to the amount obtained by specialists in other fields. At the present time the ambitious physician, in order to obtain an adequate income and one equal to other specialists, must work towards administrative positions. The men in the administrative positions are usually of excellent caliber, but it is impossible for them to care for the administrative aspects of an institution and give individual therapy to the patients as well. It might be well that these men receiving higher salaries care only for the psychotherapeutic work, giving the younger man who enters training a goal toward which he can strive. At the present time, it is well recognized that all good psychiatrists must spend some years in state hospitals to become adequately prepared in the specialty. However, the more desirable psychiatrists leave to go into the field of teaching or into private practice. Many hospitals are approved for the training of physicians in the specialty of psychiatry. However, in studying the staff lists of these institutions, it is

found that many of the members consist of resident interns, who are really carrying the greater part of the work and are inadequately trained. We have made a step forward in demanding that senior physicians be diplomates if the hospital is to maintain its rating, but one questions whether there are enough diplomates in psychiatry to fill the positions of senior in all institutions in this country, particularly at the present time.

We may be looking for an ideal situation in this plan for training hospital personnel, a plan which is not only ideal but very expensive. However, advancement is not rapidly made unless we have an aim toward which to reach. If general hospitals—and this includes the large so-called charity hospitals—can demand such training from their nurses and can appoint to their staff only physicians who are leaders and teachers in their field, there is no reason why mental hospitals cannot obtain the same end. It is all a matter of educating the public to the fact that mental disease differs in no way fundamentally from physical disease; that in mental diseases we have both the acute and chronic types; that equipment for diagnosis and treatment is just as essential in hospitals for the psychotics as it is in the general hospital, in the hospitals for the tuberculous or any other hospital. We may have to obtain increased funds at first through individual help until the public as a whole realizes the importance of adequate personnel and equipment in producing cures. Gradually, through educational processes. members of the family of the mentally ill may be induced to support their sick relatives, if not wholly, at least to the extent of their ability. It has not been a serious task for the Delaware State Hospital to increase its income from relatives of patients for care and treatment from 1 per cent of the total running expenses to twenty per cent in the past twenty years. It is the desire of this hospital to obtain still further increase up to 40 per cent, an amount which compares well with that received by the well qualified general hospital.

In addition to the above problems we find at the present time all state hospitals are greatly overcrowded. Much of this overcrowding is due to the commitment of alcoholic, senile cases and arteriosclerotics. These cases should have buildings separate from those where the acutely ill and continuous treatment cases are housed. The alcoholics need prolonged treatment but of a type different from that given the acutely ill; and the intermingling of the two types cannot be considered good therapy. The senile psychotics and arteriorsclerotic cases are not amenable to psychotherapy and their treatment is largely one of housing. They even differ from the chronic cases in that there is no chance of rehabilitating them and giving them a place in the institutional community. For the most part, the treatment is that of physical care with a certain amount of control to prevent them from harming themselves or others, and the problem becomes one of general nursing rather than psychiatric nursing.

It is essential that the medical staff obtain the maximum interest and therefore cooperation of the employees. To do this the staff must not carry a too heavy burden of cases. Even our untrained attendants can be roused to greater effort when they see results. Unfortunately psychiatrists as a rule do not have adequate time to spend with the employees. However, all of us have seen the interest with which attendants have watched a physician succeeding in quieting a disturbed case through psychotherapeutic measures or persuading a fearful patient to eat when he has refused food for days. In our hospital, we have seen attendants stimulated by the improvement noted in chronic cases through shock treatment and lobotomies. Too often an attendant will be placed on a chronic ward and because he sees no change in a patient's condition, he will assume a fatalistic attitude and will not attempt to keep his patients adequately interested and employed. The administrator of an institution should impress upon his staff members that it is essentially a part of their duties to interest other employees in the patients and to show them how they can overcome obstacles in the performance of their daily tasks. The beginning may be difficult but the reward will be an institution which has fewer problems both in connection with patients and employees. It may be well for one person on the staff to be assigned

to such duties, spending his entire time demonstrating to nurses and attendants how different patients can be managed without resorting to sedation or restraint.

Further, in conducting a successful unit for the care of the mentally ill, there must be complete freedom from political control. An ever changing staff cannot do acceptable work. Moreover, employees must have a feeling of security in their position if they are going to use their best efforts in caring for their patients. This freedom from political control is one of the greatest achievements to be obtained. Fortunately, Delaware has not found it necessary to meet this problem since the original laws were so devised that it is almost impossible for politics to play a part in the hospital management. Positions in the Delaware State Hospital are not political "plums" and employees maintain their appointment through merit and not through votes. At the same time, the legislature as well as the community must be made to recognize that state hospitals are not institutions for the poor, nor are they welfare institutions, but that they are hospitals. The patients entering the state hospitals are not only from the indigent group but came, as well, from the marginal and even more comfortable group. Many pay for their maintenance. They are sent to state hospitals because the fee in private hospitals or institutions is too high to pay for a disease which requires prolonged treatment. In some cases, the families wish to keep their relatives near home so that they can visit them more frequently. Whatever the reason, they must not be considered as public charges. In Delaware, general hospitals receive a certain amount of state support, without being state controlled and there seems to be no reason why state hospitals should not be run on much the same basis.

It is needless for me to say much about the commitment of patients to state institutions since state after state is doing away with the old legal commitment by jury trial. More and more states are passing laws which allow commitment on medical examination only with the privilege of an appeal to the court should the patient or his relatives so desire. Since on commitment a patient loses his legal rights, a great injustice is done to a certain type of mental case who can conduct his legal rights with good judgment, or in certain cases who need the treatment which cannot be offered in a general hospital, but who are not insane to the point that they have lost contact with the world or are unable to use their faculties. These cases need and desire the treatment given in institutions for mental diseases, yet, if they allow themselves to be committed, they can no longer carry on their business. For this reason, it seems to me almost imperative that there be a certain type of institution in connection with the state hospital, namely a department for observation and treatment of these types of cases; an institution which the patient enters more or less voluntarily and where no papers are necessary which deprive the patient of his legal rights. Moreover a patient who enters this department should have the right to leave if the treatment is not satisfactory either to himself or his family, even as a patient may leave a general hospital if he becomes dissatisfied. In most cases, such a department can be self-supporting since the individuals who suffer from conflicts of this type are often of superior intelligence and their families are frequently able to pay for their care and treatment. Again, the therapy is not as prolonged and the total financial burden is not as great. The Psychiatric Observation Clinic of Delaware State Hospital is such a self-supporting unit.

There is another problem which state hospitals are going to be forced to meet in this time of international stress and conflict. The first World War produced many neurotics and psychotics but the environmental factors were not as serious as those of the second World War. On reading about the present conflict it is recognized that we are fighting a "war of nerves." It is not a war for expansion but a war of ideology; consequently there is more emotional conflict present in the minds of individuals. In addition, there is more uncertainty and less security since it is impossible to know when and where the next upheaval will occur. Consequently there will probably be a still greater number of maladjusted individuals after this war than after the first World War. These maladjusted cases will be found not only in the

men who served in the army but even to a greater extent in the general population who see early ideals shattered and find that old philosophies do not work, and who are unable to rebuild or adopt new philosophies which are acceptable in the present rapidly moving civilization, whether we consider this civilization to be advancing or regressing. We must be prepared for a still greater emotional upheaval after this war which must end as all wars end, than occurred after the last war. Moreover, the hospitals which are located nearest to the defense areas must be prepared to meet acute emergencies as they arise. To-day more than ever before, we must make every effort to teach and practice better principles of psychiatry and train young people to remain normal if we are going to avoid a tremendous increase in mental diseases in a few years.

Psychiatrists must be aware of the fact that they are helpless unless they have complete support from the community. Thus each psychiatrist must become a leading medium in his immediate community endeavoring "to transmit" his new ideas and principles to the group. In this manner the nation as a whole may be prepared to accept the new approaches for the care of the mentally ill and the change in the hospital standards. The mechanical or engineering age has progressed rapidly by means of research, and psychiatry must use every effort to advance as rapidly so that the people will be prepared emotionally to meet the rapid advances in civilization from this mechanical viewpoint, without conflict.

At the present time the majority of our people are going through a period of mild emotional and social intoxication because of present economic standards in comparison with the very inadequate situation of the past ten years. This situation has kept our people at certain levels of adjustment and there is obviously no influx of mentally ill.

However, this situation is temporary and economic stress will again arise with its accompanying emotional conflict. We must not be unprepared as we were after the first World War.

In closing, I wish to suggest that the present aim of mental hospitals and psychiatrists should be:

1. The safety of the community.

2. Adequate care and treatment of the acute and subacute mental and nervous illnesses, which would require the latest equipment and facilities for all types of diagnostic and therapeutic procedures.

3. Observation clinic for maladjusted and early stages of mental and nervous illnesses, so that the individual can receive adequate treatment without commitment.

4. Proper and humane care of the chronically ill which should not be merely custodial in nature but which should be marked by every effort to rehabilitate the individual at least to a satisfactory institutional life.

5. A mental hygiene clinic for diagnostic, therapeutic and preventive purposes.

6. The examination of problem cases referred by physicians, by the state, county and city schools and agencies as well as private agencies.

7. Training resident interns in psychiatry and neurology.

8. Training interns of the general hospitals in psychiatry and neurology.

9. Training young men and women for the nursing profession.

10. Training senior student nurses of all general hospitals in the art of psychiatric nursing for a period of three months, through definite affiliations.

11. Training young men and women to be attendants, thus changing the present general concept of care of the mentally ill by untrained people. Through this means the position of attendants will have the same professional aspects as that of the nurse.

12. General education of members of the community through lectures, meetings and conferences.

13. Examination of cases for the state and city courts, penal institutions, industrial schools, schools for feebleminded and other state, county and city institutions.

14. More strict grouping of cases in mental hospitals, separating the chronic alcoholics, senile and arteriosclerotics from the other types of mental illness.

15. Establishment of a research laboratory in every state hospital caring for more than 1000 patients, under a full time well qualified research worker.

# UNITY AND CONTINUITY OF THE PERSONALITY[1]

By ARTHUR P. NOYES, M.D.

*Superintendent, Norristown State Hospital, Norristown, Pa.*

Since he has been the beneficiary of a kindly evolution *homo sapiens* has fortunately attained a status through which he enjoys an incomparably greater control over his environment than do other zoölogical classes or species. From it he fabricates instruments that seem to assure his continued zoölogical supremacy. His superior intellect with its highly developed capacity for symbol utilization has, aided by his gregarious tendencies, brought emotional and spiritual satisfactions that in many respects make him stand out in great contrast to less fortunate species. In spite of his remarkable advances in these various spheres man remains a biological organism. For that reason even such highly integrated functions and responses as striving, perceiving, thinking and feeling should be studied by the methods of biology, which in a broad sense is the study of organisms. It is in the terms of this science that the physician is primarily trained to think, although all too often he has not given adequate consideration to those functions and responses of the organism that have just been mentioned. That branch of biology that deals with the organism as a person is now often known as psychobiology—a biology of the personality, a study of its natural history. The question is at once prompted: What is the psychobiological entity which we know as the human personality? There are many conceptions of personality, and it is not easy to define what is meant by this term. Many definitions have been proposed, each discipline tending to construct one in the terms in which it is trained to think. Perhaps the psychobiologist may define the personality as that organization of constitutional, affective, ideational and conative capacities and tendencies which characterize the individual and largely determine his habitual patterns of behavior. It is an integration of all functions of the human organism including that of a mind, the function of which is characterized by symbolization.

The study of the personality must be from both a genetic and a dynamic standpoint. As has already been said man is a biological organism. Any conception of personality must therefore include that of its biological basis and its determination by the genes and their structuralized biological history. The basis of the personality is primarily physical, organic, constitutional. The nucleus of this basis, the central design of the personality is sketched in the germ plasm by the history of the species and the instinctive drives and urges which have made its continuity possible. Of scarcely more modifiable form are the specific, individual patternings which have been received from more immediate lineage. While the organic background determines the general pattern according to which the personality is fabricated, yet it would appear that its individual characteristics are influenced much less by the constitutional than by the more dynamic conative and affective forces. Yet these conative and affective aspects of the personality have also their natural history, their logical continuity, as truly as do phenomena integrated at the structural level. The principle of continuity applies to the various manifestations of the personality, healthy or diseased, as well as to other phenomena of nature. To understand his patient, therefore, the psychiatrist must retrace the thread of the personality development.

Personality, it is obvious, is the product of the total forces of the organism—forces that are exceedingly complex. To understand the workings of the organism, and therefore of the personality, one must have data from the chemist, the physicist, the biologist, the physiologist, the anthropologist, the sociologist and the psychologist. Of the various data those contributed by the psychiatrist are, we believe, the most comprehensive and informative. He possesses expert knowledge from certain of the fields mentioned, and we like to

[1] Read before the Philadelphia Psychiatric Society, October 17, 1941.

believe—perhaps at times without sufficient justification—that he possesses a certain acquaintance with them all. More than others, it seems, does he realize that psychology is not a distinctive science apart from physiology, anthropology, or even sociology. The psychiatrist, too, has most clearly perceived that most maladaptations of the individual can be understood only in terms of the psyche and that only hopeless confusion can result when one mixes the language of brain cells and nerve fibres with that of thought and behavior. He reduces man to his simplest terms, namely, a biological unit guided by its innate biological drives and by symbolization, a biological unit, however, in an environment that is social.

Whether one thinks in Freudian terms and conceives of the development of the personality as progress in the individual's sex interests or whether he is more functional and looks upon personality development as the unfolding of preformed potentialities, with the original design ever being remolded by the enregistration of experience, he will agree that there is an evolution of the personality. Perhaps more and more is the psychiatrist coming to believe that the dynamics of the personality, the forces of its development, lie in the interaction between the individual and an environment the forces of which are social and cultural—the individual being a psychobiological organism possessing both innate biological drives and affective needs. Not only are there constant frustrations in the unceasing struggle between this psychobiological organism and the forces of the culturally-conditioned environment that surrounds and penetrates it, but there are incompatibilities in its own values. There are the primary urges common to all, plus the drives, tendencies and needs peculiar to the individual, some of which he may recognize, but most of which contribute to the structure as subtly and as unapparently as do the processes of metabolism to the physical growth of the organism. In view of the total complex of genetic factors and dynamic forces that contribute to the personality it is not surprising that the product is not always desirably integrated. Indeed a complete harmony of integration is scarcely possible or perhaps essential, since the personality which operates happily, efficiently and without tension and adjusts smoothly in its relation with others meets the requirements for a successful career so far as native endowment and opportunities permit. If, however, the result is to be harmony rather than discord, the planning and orchestration of all the elements that contribute to the personality require a discerning knowledge of the orchestral instruments.

We have spoken of the human personality as a psychobiological entity, as the integrated product of constitutional, affective, ideational and conative or striving capacities and tendencies. In very general terms we have mentioned the factors that enter into the personality and urged that the method of approach to its study be biological, which means that the life history and experiences of the personality should be studied as a part of the natural history of the organism as a person. This implies that inner experiences, external influences, instinctive drives and their frustrations, psychological needs and stresses of the personality and the mechanisms by which the personality reacts to these demands and strains are biological facts no less than are physiological states, although they must be studied more in terms of the whole organism. The physiologist has to a remarkable degree determined the physical and chemical processes of the bodily tissues, their integration and adaptive significance. He recognizes many of the reciprocal forces that operate in behalf of an integrative homeostasis and the results that follow when this sustained balance is upset at the physiological level. He can graphically demonstrate changes in the electric currents of the brain or of the myocardium. The integrative homeostatic forces that maintain the internal equilibrium of the organism are acknowledged scientific facts. To an increasing degree it is conceded that psychological forces that promote or disturb the equilibrium of the personality are also worthy of scientific evaluation. These same forces are operative both in the socially adjusted and the socially unadjusted personality. There are facts of inner experience as well as of outer observation. Although psychological in nature, thoughts, emotions and strivings become no less valid scientific

facts than are chemical equations, the graphic record of electric currents or tendon reflexes.

Approaching his problem from a genetic and dynamic point of view one must seek to understand the individual as a person in terms of his own life history with his specific emotional problems. He should analyze the personality and formulate in their proper relations the constitutional, somatogenic, psychogenic and social factors that have been operative in producing the total personality reaction, including that of the psychosis. The psychiatrist approaches the personality with the assumption that all its expressions are those of fundamental, underlying psychobiological dynamics and comes to regard mental disease as an undesirable, socially impracticable functioning of the personality. This maladaptive type of personality activity is, however, the logical outcome of imprudent, inexpedient methods or mechanisms which the individual has employed in an effort to satisfy psychological needs or purposes. With an analytic historical perspective of the personality the psychiatrist brings experiences and events into etiological relationship with its present status, whether that is one of successful adjustment or is characterized by disturbing psychopathology. In both instances the personality is a continuum and one sees genetic-dynamic factors working out into a natural culmination. Psychotic manifestations, therefore, are not queer additions to the so-called "normal" personality, but are specific aspects of psycho-physiological developments which, in essence, are identical in the normal and in the pathological case. Expressed somewhat differently but still in biological terms the mental life, whether healthy or diseased, is the subjective phase of the organism's existence and relationships.

The psychiatrist, then, is concerned primarily with the behavior of a psychobiological organism, the total reaction of which may be defined as the personality. When in studying this personality he discovers unusual psychobiological reactions he applies the term "symptoms" to them if they stand out so conspicuously or are so unusual that they are considered abnormal. Really, however, like other manifestations of the psychobiological organism these symptoms, these personality expressions, are normal in the sense that they are natural or logical. Symptoms, then, are rational but extreme psychobiological reactions, the exaggeration of processes that have long been operative in the individual—processes, however, which because they did not adequately meet the emotional and other needs for which they were created became intensified until finally they came to stand out so strikingly as to be called symptoms, and, if disregardful of reality, called psychotic symptoms. They are, therefore, logical sequences which follow from the adaptive mechanisms by means of which the organism has striven to attain its goal. Long before the appearance of these psychotic symptoms there should have been less striking manifestations of the psychobiological organism's effort to meet its emotional and instinctive needs. Since earlier in this paper it was stated that the human personality is a psychobiological entity the efforts to meet these needs must long have been expressed through the personality. This, as a matter of fact, is what is constantly discovered in our patients when we observe and analyze their personality characteristics and ascertain the dynamics of the personality formation. In both the prepsychotic and psychotic life there exist psychopathological processes and behavior which the psychiatrist is not content merely to describe or to classify, but the functions of which he attempts to determine as they relate to the goals of the psychobiological organism or personality and as they are expressed in the form of character traits. He attempts also to analyze and reconstruct in their flow of dynamic relationship the common factors that have been operating in both the previous personality and in the psychosis. In both the prepsychotic life and in the psychotic symptom there will be revealed the way the patient has reacted to specific personality needs, to the demands which life has made upon him. The patient's history will show that the psychological techniques which he was accustomed to employ during his prepsychotic life in dealing with the problems which confronted him were fundamentally the same as those which later created the psychotic symptom. This, of course, does not exclude a tendency on part of the psychotic patient to drop mature patterns of behavior in favor of out-

grown and easier ones. The same mental mechanisms, the same psychological goals which during the psychosis become exposed with obvious transparency were active in determining character traits long before the psychosis appeared—or rather long before they so disturbed the individual's social adjustment that he was termed psychotic. For after all is not the psychosis merely a way of life—a way which is designed to afford a more tolerable solution for the particular problems with which the individual is confronted, but a way which so impairs his assimilation as a social unit that society is apt to segregate him? Is not the psychosis in effect a way of working out basic emotional problems and difficulties? If the psychosis is a way of life adopted to meet problems too difficult to be successfully met by more socialized, more conventional methods, the psychiatrist will scarcely seek to make a "diagnosis" in terms of some disease entity. Rather will he attempt to analyze the complicated forces that have contributed to the organization of the personality, and the diagnosis will consist of a formulation of the problems to be met, of the techniques by which the individual attempted to meet them, and of the results to which these techniques led. The formulation of the patient's clinical picture is therefore in terms of the familiar forces of everyday human life. To be sure, the physical state of the individual may influence his ability to deal with these common problems and may stimulate reactions of a deeper psychological nature. The formulation, however, is the reconstruction through a genetic approach of the patient's inner life history. Such a formulation tends to exclude ones permeated on the one hand with dualism or on the other with quasi-animistic concepts, both of which unduly suggest the antithesis between mind and body. It tends, also, to prevent an overstressing of the theory that the normal, basic personality is largely biochemically determined and that therefore mental illness with its exaggerations of personality is likewise determined.

If the wounds, dilemmas and frustrations which life brings the individual produce problems so difficult and emotional needs so demanding that they can be met only by methods which impair or destroy one's social assimilation, evidence of attempts to deal with these problems and needs must presumably have existed long before such extreme techniques were employed. The insights afforded by psychiatry reveal clearly that this is the case, that psychological devices designed to meet its needs have long been shaping the personality along the lines which later in the psychosis stand out in such misshapen form. It is well recognized, too, that many social institutions have originated through persons who in establishing them were attempting to satisfy their own needs. These insights reveal that a single meaningful process runs through both the prepsychotic and the psychotic personality. In both there is a constant effort to work out deeply-seated emotional problems and difficulties. The psychosis discloses more sharply both the attitudes which have been subtly developing for years in response to deeply-seated psychological needs and the manner in which the personality has attempted to meet its stresses. The embryology of the psychosis may therefore be studied in the prepsychotic personality of the patient. The genetic factors may often be detected in the early pattern and responsive tendencies characteristic of the individual personality. When the significance of this pattern is discovered, the psychosis comes to have a logical place in the pattern's evolution. Personality characteristics and neurotic or psychotic symptoms frequently represent allied efforts toward the same goal. If the goal of the personality is determined the behavior of the individual, whether termed psychotic or not, is thereby rendered intelligible. The same psychological theme runs through personality, character traits and neurosis or psychosis. Anxiety in the child, for example, may become structuralized either in the form of neurotic symptom or of character trait. Like more narrowly biological phenomena, such as fever, inflammation and other morbid processes, many personality characteristics which are conspicuously exaggerated and fixed as well as most psychoses are defensive, protective and reparative in purpose. Both such personality characteristics and the psychosis are expressions of the psychobiological organism's attempt to effect an adjustment to the interplay of psychological,

social and physiological forces impinging upon it, the psychosis often representing a progressive evolution of the personality's measures. When the significance of the patient's personality pattern is ascertained, the psychosis is seen to have a logical place in the evolution of that pattern, to be but another instance of the adaptive character of biological phenomena. The symptom, whether it be the delusion, the hallucination in the psychosis, or the compulsive act or hysterical paralysis in the psychoneuroses, performs a function in the life of the patient. A study of the personality will disclose that its striking characteristics also serve some function. Just as the symptom is a psychobiological reaction of the total organism at the mental level and should be approached in terms of dynamic concepts, so the personality, too, should be studied by the same methods to ascertain the forces which determined its characteristics. A study of the personality pattern, like that of the psychotic symptom, should reveal the problems of the individual and the methods by which he is struggling to meet them. Such a point of view is consistent with the increasingly accepted belief that the person with nervous or mental symptoms is of fundamentally the same organization as the so-called normal person. A study of the personality of the latter and of the symptoms of the former reveals the workings of forces shared by all. A genetic mode of approach to the understanding of personality and behavior leads to the discovery of a common denominator to which the motivational dynamics and their results in both the normal and the abnormal personality may be reduced. By such a method one is able to see behind superficial appearances into the deeper needs, impulses and motivation of the patient's personality. It discloses, too, the reason for the individual's habitual manner of reacting in the various spheres in which life requires adjustment.

Reference was made to the fact that the same psychological theme runs through both personality and psychosis, molding the former and determining the nature of the latter. A sense of insecurity, for example, may be created during the early developmental stage of the personality, perhaps because the child is illegitimate, perhaps because a mother's assurances of affection are lacking, or because for some other reason he fails to attain a feeling of "belongingness." Constantly the psychiatrist observes the permanent damage done to the personality by the absence in childhood of the stimulating, wholesomely developing influence of affection, tolerance and security. By kindergarten age the insecure child may be tense, restless and "nervous." Then or a little later in childhood when confronted with tasks which are unusually hard he becomes panicky, and either gives up quickly or will not attempt anything that on its surface seems difficult. He constantly seeks the reassurance of praise, of marks, of success, but never seems satisfied. He may run away from every situation that involves competition, perhaps reverting to thumb-sucking or other childish habit. He is usually bashful in the presence of others. Even with the arrival of adult years the insecure person continues timid and seeks the reassurance or approval of others. He is cautious, conservative, frugal, perfectionistic, worrisome, lacks aggressiveness, is apprehensive and shrinks from responsibility. Decisions are made with difficulty. Changes requiring readjustments provoke tension and anxiety. Security is sought through various "faiths." If he is religious his religion contains much family symbolism—God is a father who watches over him. Provided there are no other serious personality problems, and the individual through religion or other supporting means obtains a certain feeling of security, he may pass through life without any seriously disturbing incident in his mental health, although with less vocational success than native intellectual endowment warrants. If, however, the source of support is removed by loss of position, by death of spouse or by removal of other sustaining foundation, then the frail sense of security may be destroyed. Especially is this apt to happen if the misfortune occurs at the involutional period when new physiological and psychological burdens are imposed. Extensive changes are then taking place in the endocrine and vegetative systems. Perhaps life has not brought either the success or the satisfaction that hope had cherished. The fact that opportunity no longer exists for repairing old errors or achieving new successes

creates a sense of frustration and increases the feeling of insecurity. It is not surprising, therefore, that under these additional psychological and biological burdens, this conspiracy of dynamic factors, the life-long insecurity of personality passes into depression, apprehension, anxiety, ideas of death and hypochondriacal delusions.

Characteristics that permeate and color the entire personality may arise from various emotional needs. For example, a desire for personal value, for recognition, may evoke characteristics aimed to enhance self-esteem. The dominant motive may be a struggle for attention, distinction, fame or social position. If combined with intellectual capacity and an environment presenting favorable opportunity this drive for recognition constituting a dynamic personality factor may lead to outstanding success and leadership. If the desire for recognition is not adequately satisfied efforts may be made to secure it through various ill-advised aggressive attempts at domination and mastery. If frustrated a fictitious substitute designed to meet this need may be developed and psychotic ideas of grandeur arise.

As has been suggested many of those psychobiological reactions which we know as personality characteristics represent efforts to reach the goals of the psychobiological organism. Particularly important are those characteristics which serve as mechanisms of defense and are known as reaction-formations. These reactions arise from a persistent wish not to face the real but repudiated basis of one's behavior and represent an effort to conceal and deny them. They often result from a failure to meet self-imposed requirements or effect a harmonious compromise with impulses and drives that cannot be consciously acknowledged. Reaction-formations, through their function of excluding repudiated drives and desires from overt expression or from conscious recognition play an important part in personality formation. Overstrict character traits, for example, are often reaction-formations against forbidden tendencies, drives or desires. A timid attitude may mask hostility and irritability. Such precautionary measures designed to restrain certain impulses lead to the intensification of opposite types of behavior. A defense is secured by continual testimony to the contrary. Closely allied to the mechanism of reaction-formation is that by which men fortify themselves against deeply-seated fears and insecurities by never admitting any misgivings or mistakes—not even to themselves.

Reaction-formations can scarcely be called pathological unless they function with unusual force or frequency; yet these, like other personality patterns designed to satisfy some deeply-seated emotional need, tend to become more stereotyped and extreme. Finally if the task of maintaining them becomes too great the effort may fail and the prohibited desires and drives come to expression in so overt and unrestrained a form that the behavior is called psychotic. Again we see the same psychological theme running through personality and psychosis.

In spite of the apparent stress in this paper on its psychological components, the personality is, of course, the product of the total forces of the organism. Those expressions of the personality which we designate as psychoses are therefore likewise their product. In this discussion diseases of the central nervous system in which structural disturbance or degeneration of the higher cortical neurones occurs with a resulting reduction of mental stock and capacity have been purposely disregarded. Such are largely impersonal disease processes. The individual suffering from the personality disorders which have been discussed is not, it seems to me, suffering from a disease entity but rather as an inevitable result of his equipment and of his life experiences in a broad sense of the term, is either distressed himself or causing distress to others through logical developments in his personality that result in overt changes in his behavior or in his attitude toward life. Macfie Campbell once commented that the human personality may be studied either as a complicated reactive mechanism or as a system of spiritual forces. An inclusive psychobiology, it seems to me, does not exclude the latter.

# EXPERIMENTAL "SHOCK THERAPIES" IN CATS WITH INSULIN AND METRAZOL

## Histopathologic Study [1]

By META A. NEUMANN, M.S., ROBERT COHN, M.D., and SOLOMON KATZENELBOGEN, M.D.[2]

*Saint Elizabeths Hospital, Washington, D. C.*

The severe clinical reactions observed in patients under insulin and metrazol treatment have stimulated the interests of investigators to study the effects of these drugs on the central nervous system of experimental animals as well as human subjects.

In general the published reports(1-15) indicate that insulin is found to cause more or less widespread damage to cortical neurones, proliferation of gliacytes, and in the hands of some experimentors, severe lesions in Ammons' horns. Petechial hemorrhages too, are frequently seen.

As to the effects of metrazol on the central nervous system, there is disagreement among experimentors(13-21). At least 3 groups of workers conclude that the drug causes practically no histopathologic alterations; others report marked histopathologic changes.

A total of 27 cats were used in our study. Nine cats were "treated" with insulin; 11 were subjected to metrazol induced convulsions; while the remaining 7 were used as controls. Some of the animals contracted sniffles during the course of the experiments.

The experimental procedure employed closely approximated that generally used in the treatment of patients.

Except when spontaneous death occurred the animals were sacrificed at chosen intervals, either by decapitation or by intracardiac injections of air. This latter method was found more satisfactory in that there were no agonal convulsions.

A complete autopsy was performed either immediately, or within a few hours after death. Sections for microscopic examination were selected in every case from the following organs: heart, lungs, liver, pancreas, spleen, kidney, adrenal. Our reason for studying the viscera as well as the central nervous system was the fact that we believe with Wertham(23) that the brain is an organ, and that changes produced on its component cells by therapeutic drugs should not be treated as isolated phenomena but as part of the general system effect.

In every animal from 8 to 10 approximately parallel coronal sections through the cerebral hemispheres and brain stem were studied. Interrupted serial sections were made in a number of instances from the thalamus and from the hippocampus. The spinal cord was studied at 3 levels; cervical, thoracic and lumbar regions. The following staining methods were used on each level of the nervous system studied: hematoxylin and eosin, cresyl violet, and Weil method for myelin sheaths. Special silver staining techniques were carried out when indicated.

As far as can be gathered from similar available studies, this report is the only one where histopathologic examinations have been made not only on the central nervous system, but on visceral organs as well.

### Insulin Experiments

The initial dose of insulin was usually two units. The dosage was gradually increased to a quantity sufficient to produce coma. The minimum dose of insulin necessary to produce coma was usually 3 units; the maximum 8 units. Injections of insulin were given daily with the exception of Saturdays and Sundays. The animals were

[1] Read at the ninety-seventh annual meeting of The American Psychiatric Association, Richmond, Virginia, May 5-9, 1941.

Our research work in schizophrenia is in part aided by the Supreme Council, 33rd Degree Scottish Rite, Masons of the Northern Jurisdiction, U. S. A.

[2] Clinical Professor of Psychiatry, George Washington University School of Medicine.

allowed to remain in coma approximately 3 hours. Twenty per cent glucose was then administered by stomach tube or intravenously, depending on the clinical condition of the subjects. All of the cats gained weight during the treatment period.

Table I gives a summary of the clinical data in the insulin experiments.

The experiments ranged from 1 day to 91 days. The minimum total dose of insulin was 50.5 units, the maximum 341.

The most common finding in organs of chest and abdomen is congestion and stasis. Hemorrhages occur fairly often. Some of our other findings in these organs are: chronic myocarditis; round cell infiltration in pancreas; round cell infiltration in liver; these vessels there is marked infiltration with neutrophilic and eosinophilic leucocytes in the intima and adventitia.

The following outstanding alterations are noted in the brains of cats treated with insulin:

Acute nerve cell changes, *i.e.*, chromatolysis and swelling, cytolysis or karyolysis can be found in almost every case. These changes are not uniformly distributed. In the cortex the small nerve cells are chiefly affected. We emphasize the fact that in most instances these pale swollen neurocytes are found scattered in otherwise relatively intact parenchyma. The exception to this occurs in those animals which died of hypoglycemic shock where the nerve cell

TABLE I

SUMMARY OF DATA IN INSULIN EXPERIMENTS

| Cat No. | Duration of experiment, days | Total units of insulin | Number of comas | Mode of death |
|---|---|---|---|---|
| 1 * | 66 | 142.25 | 32 | S |
| 2 * | 67 | 341.25 | 31 | S |
| 3 | 1 | 145 | 1 (prolonged) | D |
| 4 | 70 | 221 | 26 | S |
| 5 | 70 | 181.5 | 25 | S |
| 6 * | 71 | 86 | 26 | S |
| 7 * | 41 | 50.5 | 10 | D |
| 8 * | 91 | 130 | 37 | S |
| 9 * | 73 | 236 | 41 | S |

* represents sniffles during course of experiment.
S represents sacrificed.
D represents died from acute hypoglycemia.

focal calcification in adrenals; and megakaryocytosis in the spleen. In two instances an active pneumonic process was found in the lungs. One of these cats died of secondary hypoglycemic shock after her 14th injection. This animal also suffered from an active sinusitis. Another animal developed a purulent conjunctivitis which resulted in phthisis bulbi. Coma was always induced very easily in this cat; 3 units was found sufficient throughout most of the experimental period.

Our most interesting extra-cerebral finding was a peculiar condition noted in the pulmonary arteries of two animals. The walls of these vessels were tremendously thickened and the lumen correspondingly narrowed. There seems to be a uniform proliferation of the lining cells. In some of destruction is more widespread. This is illustrated in Fig. 1, where we see intense vacuolization and cytoplasmic disentegration in the cortical neurocytes. This cat received a massive dose of 145 units of insulin and remained in coma 7 hours before death.

Ammon's horn in every cat seems to be intact although occasionally there are isolated instances of vacuolization, chromatolysis and cell destruction. Interrupted serial sections of this area were studied in every insulin treated cat.

Neurocytes showing chronic changes are observed in the cortices of 4 cats. In Fig. 2 we see examples of pyknosis, thickened apical dendrites, vacuolization, lysis, shadow cells, in a cat which received a total of 236 units over a 73 day period.

Sometimes acute and chronic cell change

could be found side by side as shown in Figs. 3a and b. Fig. 3a shows the nucleus salivatorius superior. Almost every nerve cell shows severe damage. In an adjacent area of the medulla oblongata (Fig. 3b) many of the nerve cells show marked sclerosis and shrinkage.

Small glia nodules are found in various parts of the central nervous system in 5 animals. They are especially numerous in one cat which shows in addition a chronic meningo-encephalitis and myelitis. Microglia show progressive changes in only 2 cases. Petechial hemorrhages are found in the brains of 4 cats.

*Cat 1* was found dead 2 days after her third injection of metrazol. *Cat 2* died in status epilepticus (22 minutes duration) after the second intraperitoneal injection of metrazol. In the remaining animals the experimental period varied from 39 to 99 days. The total amount of metrazol ranged from 513 to 3100 mg. The animals were usually sacrificed on the day following their last metrazol convulsion.

In this group too, congestion and stasis occur frequently in the abdominal and thoracic viscera. Petechial hemorrhages are found in myocardium, lungs and kidneys in a number of instances. Increase in interstitial fibrous tissue was noted in the myocardium of 2 animals. In one cat death was caused by spontaneous rupture of the heart near the site of a recent infarct, a few hours after the thirtieth convulsion. The last 4 injections of metrazol had been via the cardiac route in this cat. Five cats showed the peculiar condition of the pulmonary vessels which we have called endarteritis. The extent of the lesion in 1 animal can be seen in Fig. 4.

There was apparently a rather severe glomerulonephritis in 3 animals. Foci of round cells are found in the liver in 4 cases. Focal calcification was present in 1 adrenal. In the spleens we found endarteritis, fibrosis, eosinophilia and reticulo-endothelial hyperplasia.

In the central nervous system petechial

TABLE II

SUMMARY OF DATA IN METRAZOL EXPERIMENTS

| Cat No. | Duration of experiment, days | Number of injections | Number of convulsions | Amount of metrazol injected in mgs. | Mode of death |
|---|---|---|---|---|---|
| 1 | 10 | 3 | 2 | 24 | D |
| 2* | 2 | 2 | status epilepticus | 50 | D |
| 3 | 61 | 22 | 20 | 1,698 | S |
| 4 | 39 | 15 | 15 | 735 | S |
| 5 | 83 | 33 | 32 | 3,100 | S |
| 6 | 74 | 29 | 24 | 2,055 | S |
| 7* | 96 | 31 | 30 | 1,355 | S |
| 8 | 99 | 43 | 30 | 1,855 | D |
| 9* | 99 | 45 | 30 | 2,043 | S |
| 10# | 48 | 16 | 16 | 513 | S |
| 11 | 69 | 33 | 31 | 1,350 | S |

* represents "sniffles" during course of experiment.
S represents sacrificed.
D represents died spontaneously.
# represents eye infection.

## METRAZOL EXPERIMENTS

Table II summarizes the clinical data in the metrazol experiments. A 10 per cent solution of metrazol was used throughout. In the earliest experiments the drug was injected intraperitoneally. Relatively large doses (140 mg.) were needed to produce a convulsion by this route. Shortly, however, it was found far more satisfactory to introduce the solution into the vena radialis(24).

The convulsant drug was administered three times a week. If a convulsion did not occur within a few minutes after the first injection a second one was given. In a few instances a third injection was found necessary to produce a convulsion. When a minimal dose did not produce a convulsion, auditory stimuli sometimes *triggered* the intense motor activity.

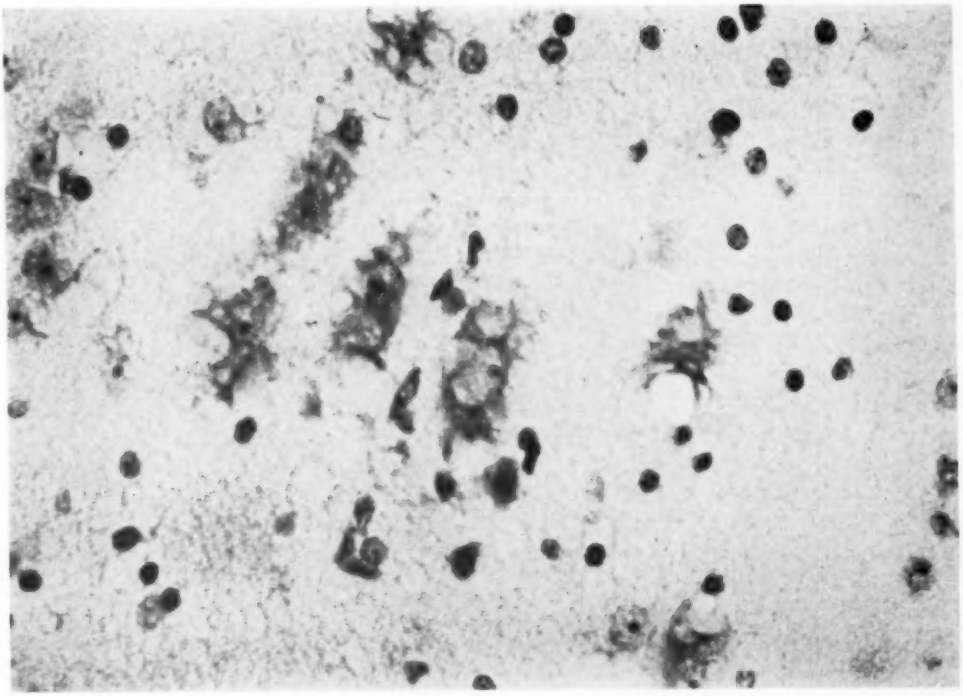

FIG. 1.—Insulin cat 3. Acute hypoglycemia. This cat was given a massive dose of insulin (145 units). The animal remained in deep coma of 7 hours duration before death. Vacuolated nerve cells in cortex. Cresyl violet stain.

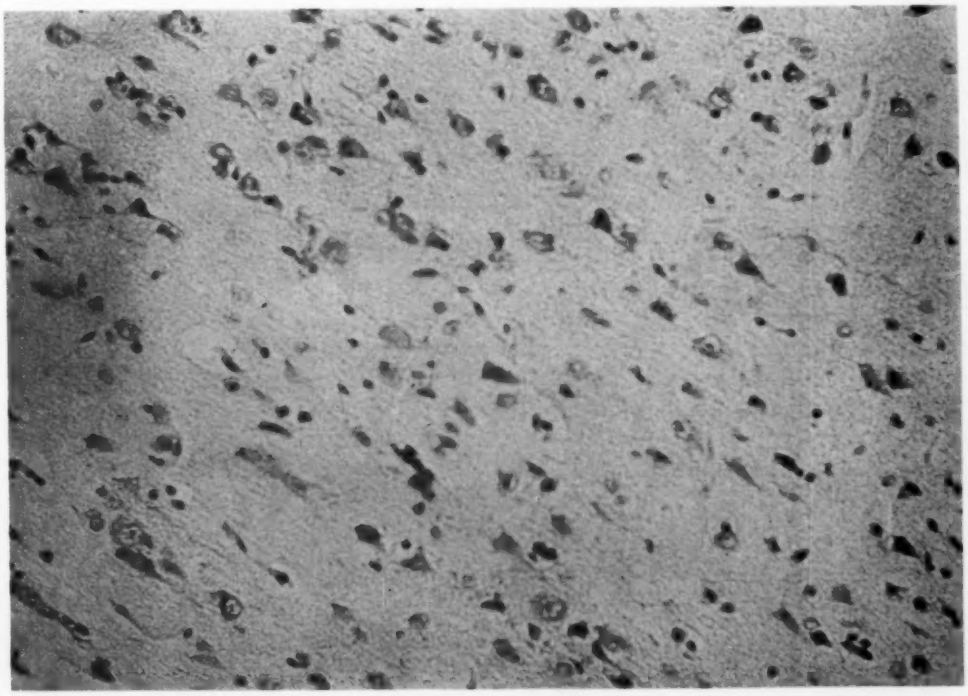

FIG. 2.—Insulin cat 9. Cortex. Pyknosis, vacuolization and lysis of neurocytes. Cresyl violet stain.

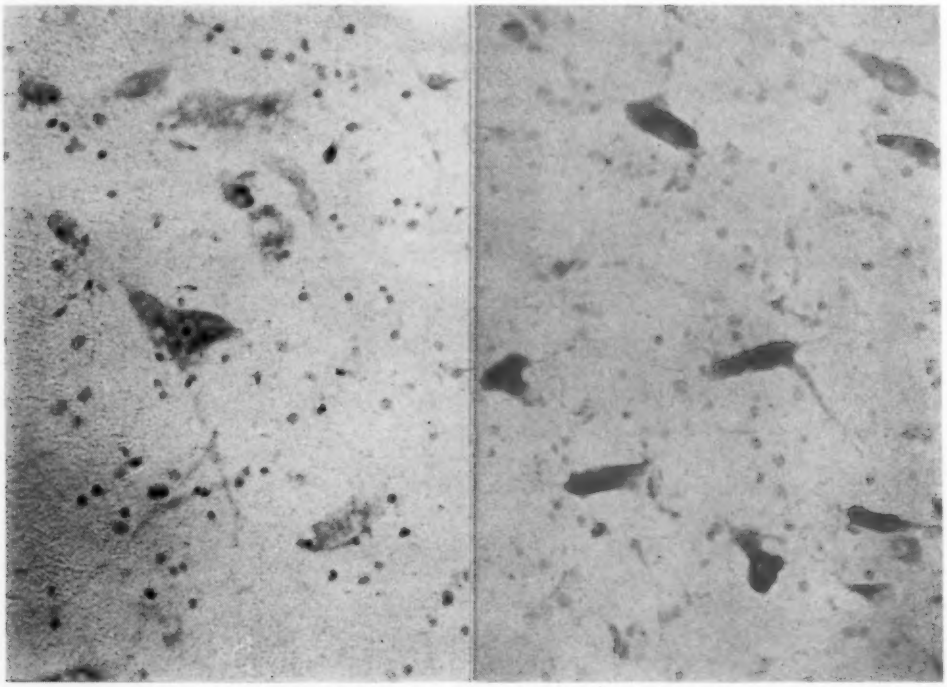


FIG. 3.—Insulin cat 3. Medulla oblongata. Cresyl violet stain. (a) Vacuolization and lysis of neurocytes of nucleus salivatorius superior. (b) Pyknotic nerve cells in adjacent area.

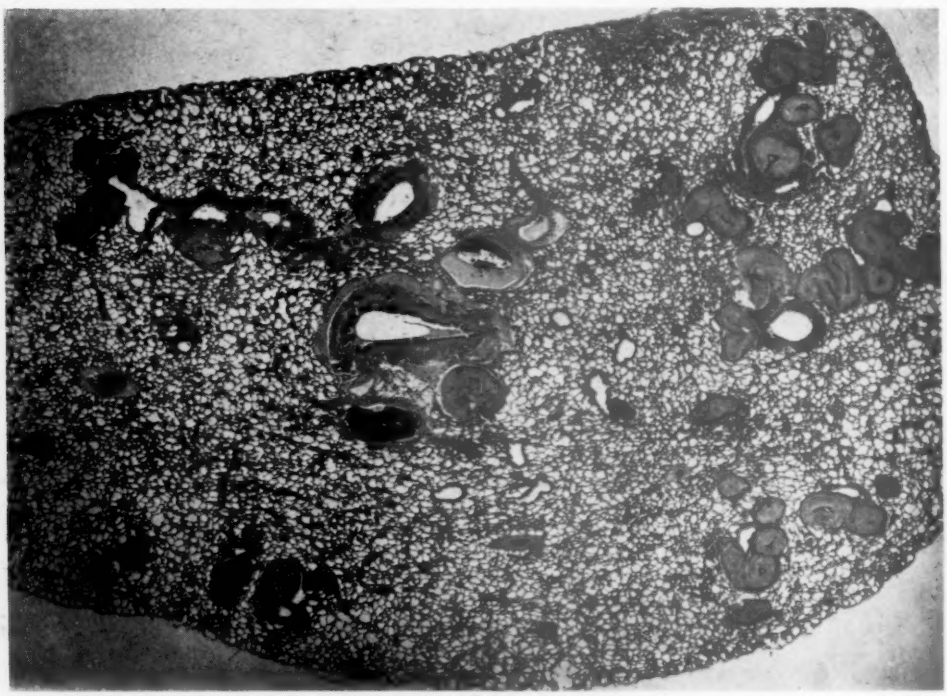

FIG. 4.—Metrazol cat 9. Lung: Endarteritis obliterans.

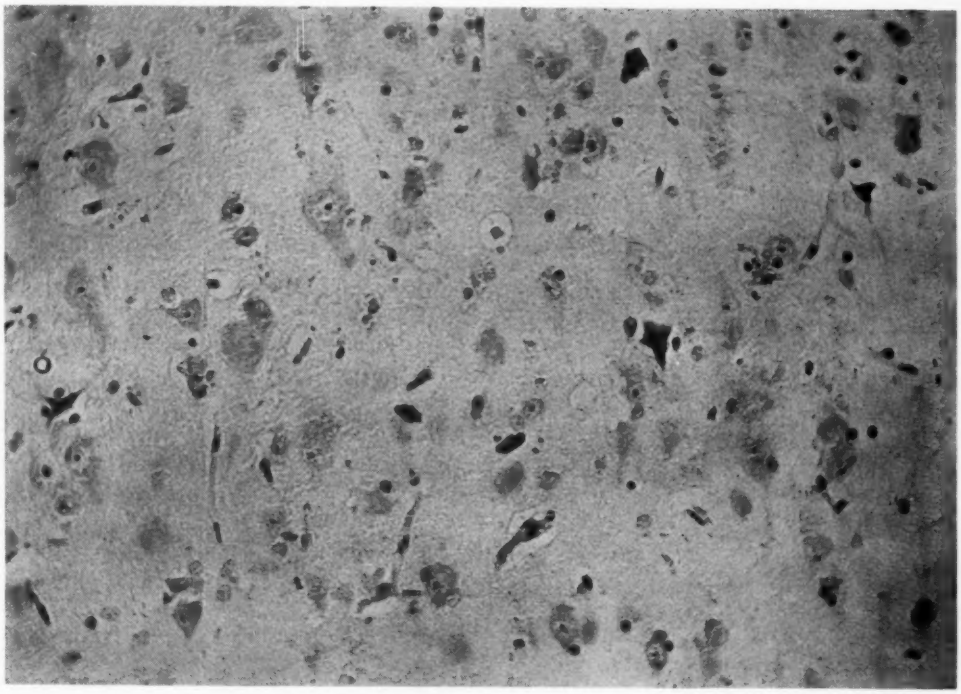

FIG. 5.—Metrazol cat 4. Cortex. Pyknosis, vacuolization and chromatolysis of neurocytes. Disturbance of architecture. Cresyl violet stain.

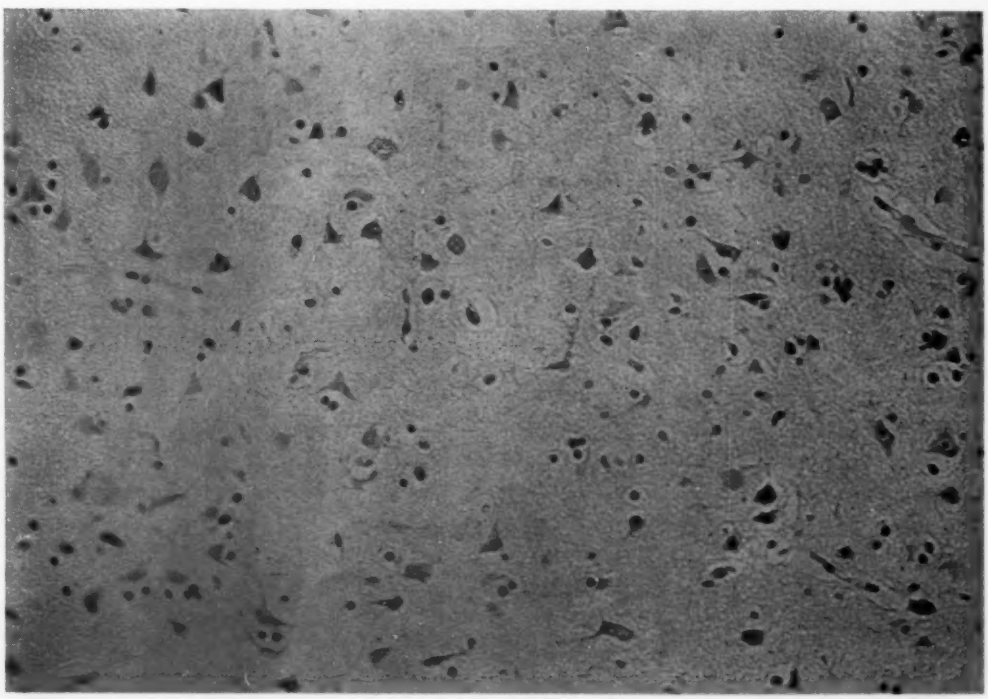

FIG. 6.—Control cat 4. Cortex. Disturbance of architecture. Reduction in number of nerve cells. Pyknosis. Edema. Cresyl violet stain.

UNIV. OF MICH.

hemorrhages are found not only in the cat which died in status epilepticus but in 3 cats sacrificed a day after their last metrazol convulsion. Scattered instances of chromatolysis and cytolysis of neurocytes may be seen in the cortex, as well as instances of pyknosis. In Fig. 5 we see rather widespread changes occurring in the cortex of a cat which received a total of only 735 mg. of metrazol and underwent 15 convulsions. Such a picture is rather unusual, however, for in general the cortex shows much less evidence of cell damage. The diencephalon in 5 of the 11 cats seems to have suffered more change than the cortex.

Small glia nodules are found in 2 cases. One cat shows perivascular round cell infiltration. Another cat, suffering from an eye infection, has a mild leptomeningitis. Focal congestion throughout the cerebrospinal nervous system is frequently observed. In 2 cases the neocortex shows proliferation of capillaries.

### Control Group

Of the 7 animals in this group, 3 lived in the laboratory for many months under the same environmental conditions as the experimental cats. Two others were sacrificed within 24 hours after their arrival in the laboratory. The remaining 2 animals died of "sniffles" a few days after arrival at the laboratory. Complete histopathologic investigations were carried out, however, on these 2 cats, as it was considered they would serve as controls for the several experimental animals who contracted "sniffles" during the course of the treatment.

Congestion is present in the viscera in many instances. The condition we have called pulmonary endarteritis is found in one animal. Chronic glomerulonephritis is found in 2 cases. These same 2 animals show reticulo-endothelial hyperplasia in the spleen. A recent infarct was found in the myocardium of one cat. One animal which had lived in the laboratory for 3 months showed severe infestation with lung worms. Another control animal was found at autopsy to have acute mastoiditis.

In this group of animals we find similar scattered instances of cortical neurone damage. Severe nerve cell change is found in 4 cats. Fig. 6 shows a picture of disturbed lamination and polarity, reduction in number of nerve cells, pyknosis and edema. This same animal shows marked degeneration of the parolivary nuclei where vacuolization and cell death occur in symmetrical areas.

The cat infested with lung worms shows a picture of toxic encephalopathy.

Petechial hemorrhages are found in 2 cats. Three cats show congestion and stasis of cerebral vessels.

### Summary

The effect of sniffles on the central nervous system is difficult to evaluate. We are also at a loss to explain the peculiar changes of the pulmonary vessels. We were unable to find any references in the literature pertaining to this condition. Congestion and hemorrhages in thoracic and abdominal organs were equally pronounced in both treated and control animals.

It should be emphasized that in every animal brain one could see instances of ischemic homogeneous changes as well as acute pallor, swelling and chromatolysis, often side by side. Cells undergoing cyto- or karyolysis could always be found. Other neurocytes were entirely normal and showed well-stained Nissl substance.

In view of the findings of other workers, Ammons' horn was studied with particular care in every instance. We agree with Winkleman's and Moore's observations that there are no widespread changes in this area subsequent to either insulin or metrazol injections.

### Conclusions

1. No clear quantitative or qualitative changes could be found to differentiate the insulin and metrazol from the control animals when these drugs were given in ordinary therapeutic doses. In the 2 animals which received relatively massive terminal doses of insulin cell damage was a little more widespread.

2. There is a need for further investigation with particular attention to control studies.

## BIBLIOGRAPHY


1. Katzenelbogen, Solomon: A critical appraisal of the shock therapies in the major psychoses. II—Insulin. Psychiatry, May 1940.

2. Accornero, F.: Experimental histopathological researches on insulin shock. Am. J. Psychiat., **94** (supplement): 130-133, 1938.

3. Baker, A. B.: Cerebral damage in hypoglycemia. Am. J. Psychiat., **96**: 109-127, 1939.

4. Tani, N.: Experimentalle Beiträge zum Insulinkrampf mit Berücksichtigung histopathologischer Befunde. (Abstract by Alexander Pilcz.) Zentralbl. ges. Neurol. Psychiat., **80**: 30, 1936.

5. Stief, A., and Tokay, L.: Beiträge zur Histopathologie der Experimentellen Insulinvergiftung. Zeitschr. f. d. ges. Neurol. u. Psychiat., **139**: 434-461, 1932.

6. Stief, A., and Tokay, L.: Weitere Experimentelle Untersuchungen über die Cerebrale Wirkung des Insulin. Zeitschr. f. d. ges. Neurol. u. Psychiat., **153**: 561-572, 1935.

7. Grayzel, D. M.: Changes in the central nervous system resulting from convulsions due to hyperinsulinism. Arch. Int. Med., **54**: 694, Nov. 1934.

8. Schmid, M. H.: l'Histopathologie du Shock Insulinique. An. Med. Psychol., **94**: 658-664, 1936.

9. Nicolajev, V.: A special glial alteration after repeated insulin shock in animals. Am. J. Psychiat., **94** (Supplement): 302-304, 1938.

10. Tannenberg, J.: Comparative experimental studies on symptomatology and anatomical changes produced by anoxic and insulin shock. Proc. Soc. Exper. Biol. & Med., **40**: 94, 1939.

11. Appel, K. E., Alpers, Bernard J., Hastings, D. W., and Hughes, Joseph: Central nervous system changes produced by insulin. Am. J. Psychiat., **96**: 397-401, 1939.

12. Weil, Arthur, Liebert, Erich, and Heilbrunn, Gertrud: Histopathologic changes in the brain in experimental hyperinsulinism. Arch. Neurol. and Psychiat., **39**: 467-481, 1938.

13. Finley, Knox H., and Brenner, Charles: Neurohistopathologic changes resulting from insulin and metrazol "treatment" in monkeys. Arch. Neurol. & Psychiat., **44**: 696, 1940.

14. Winkelman, N. W., and Moore, Matthew, T.: Neurohistopathologic changes with metrazol and insulin shock therapy—An experimental study on the cat. Arch. Neurol. & Psychiat., **43**: 1108, 1940.

15. American Journal of Psychiatry. Vol. 94. May 1938. Supplement Number. Reports from 89th Meeting of Swiss Psychiatric Association.

16. Katzenelbogen, Solomon: A critical appraisal of the shock therapies in the major psychoses and psychoneuroses. III—Convulsive therapy. Psychiatry, Aug. 1940.

17. deMorsier, G., Georgi, F., and Rutishauser, E.: Experimental studies of convulsions provoked by cardiazol in rabbits. Am. J. Psychiat., **94** (supplement): 207-208, 1938.

18. Strecker, Edward A., Alpers, Bernard J., Flaherty, James A., and Hughes, Joseph: Experimental and clinical study of effects of metrazol convulsions. Arch. Neurol. & Psychiat., **41**: 996-1003, 1939.

19. Liebert, Erich, and Weil, Arthur: Histopathologic changes in the brain following experimental injections of metrazol. Arch. Neurol. & Psychiat., **42**: 690-699, 1939.

20. Stender, A.: Ueber Provokation epileptiformer Anfälle durch Cardiazol (experimentelle und histopathologische Untersuchungen an Tieren) München med. Wchnschr., **84**: 1893, 1937.

21. Kastein, G. W.: Veränderungen in der Form der Neuronen des Gehirnes und des Rückenmarkes bei Kaninchen nach 1, 3, 5, 10, 15 Insulten nach intravenöser Injektion von Pentamethylentetrazol. Psychiat. en neurol. bl., **42**: 136, 1938.

22. Cleckley, Harvey, Bowles, Lester, and Mettler, F. A.: Histologic changes following metrazol convulsions. With note on a fuchsinophilic reaction as an index of early neurocytologic change. Arch. Neurol. & Psychiat., **43**: 948, 1940.

23. Wertham, F.: The brain as an organ. McMillan Co., 1934.

24. Anderes, R. L.: Technic of intravenous medication in cats. North American Vet. J., **16**: 44-46, 1935.

25. Winkler, C., and Potter, A.: Anatomical guide to experimental researches on the cat's brain. Amsterdam, W. Versluys, 1914.

# MENTAL SYMPTOMS IN NARCOLEPSY[1]

## Forgetfulness and Learning Difficulty as Manifestations of Excessive Inhibition of the Highest Cerebral Centers

By MAX LEVIN, M. D., Baltimore, Md.

Mental symptoms in narcolepsy have not been accorded the attention they deserve, partly because they have been cast into the shade by other and more spectacular manifestations of this disorder. In discussing these mental symptoms I shall try to show that they are not merely incidental phenomena of only trivial significance, but constitute a true element of the narcoleptic picture, being a direct result of the neurophysiological disturbance that underlies this disorder.

The key to the pathogenesis of narcolepsy is furnished by Pavlov's experiments on cerebral inhibition and by his demonstration that inhibition and sleep are one and the same thing. As I have already considered this matter in detail elsewhere (1-6) I shall discuss it here only briefly. In working with already established conditioned reflexes Pavlov found that certain conditions led to the inhibition of these reflexes. He found too that under these conditions the animals in many instances grew drowsy and even fell asleep in the experimental harness. He concluded that sleep is a cerebral inhibitory state. In his words (7), "internal inhibition during the alert state is nothing but a scattered sleep, sleep of separate groups of cellular structures; and sleep itself is nothing but internal inhibition which is widely irradiated, extending over the whole mass of the hemispheres and involving the lower centres of the brain as well." [2]

The significance of Pavlov's work for narcolepsy is emphasized by the fact that narcoleptics tend to fall asleep under conditions exactly like those which gave rise to inhibition and sleep in his experiments. His experiments on "conditioned inhibition" may be cited in illustration. In these he combined a conditioned stimulus with another stimulus, but did not reinforce the combination. Thus, in the case of an animal which had already acquired a conditioned alimentary reflex to a metronome, food was given on the sounding of the metronome but not when this stimulus was accompanied by thermal stimulation of the skin. After such conditioning the animal responded, as always, with salivation to the metronome alone, but not to the combination of metronome and thermal stimulation. Pavlov (using also other data which need not be cited here) concluded that cerebral centers for salivation were excited by the metronome alone, but that when the combination of stimuli was offered this excitation was overcome by inhibition. Moreover, in response to the inhibitory combination of stimuli the animal was apt to grow drowsy and fall asleep; Pavlov suggested that this resulted from irradiation of the inhibition. I submit that these experiments throw light on the tendency of narcoleptics to fall asleep when faced by unpleasant situations from which they would like to, but cannot or dare not, escape. Thus workmen with narcolepsy have fallen asleep while working on high scaffolds; soldiers brought up to the front line have fallen asleep under their first bombardment; one patient fell asleep in the dental chair during the actual drilling of a tooth. These experiments of Nature duplicate Pavlov's on conditioned inhibition. When a man

[1] From the sub-department of neurology, the Johns Hopkins University, Baltimore, Md.

[2] Pavlov used the word "inhibition" in a sense different from the ordinary. As customarily used, the word designates a function performed by inhibitory centers, which, during such performance, are in a state of *excitation*. Thus, inhibition of the heart ensues on excitation of the vagus. Accustomed to this use of the word, physicians are apt to be puzzled by Pavlov's views, for it is hard to reconcile sleep (obviously a resting state) with widespread inhibition (implying excitation of inhibitory centers). It therefore must always be remembered that Pavlov used the word in another sense, to denote the state of cerebral cells when they are not excited—a state of quiescence, in which cells recover from the effects of excitation.

perceives a peril from which he wants to escape, but is deterred by some other circumstance such as the wish to appear brave, he is being acted on by an "inhibitory combination" of stimuli: excitations which under simpler conditions would be given free rein are now checked by an inhibitory process. Thus the sleep attacks just cited may be said to have resulted from the irradiation of an inhibitory process evoked by the situation. But since only one workman in many thousands gets sleepy on a scaffold, one may say that narcoleptics, by falling asleep in such situations, betray an undue susceptibility to inhibition. This excessive "inhibitability" or fatigability of the brain is, it would seem, the immediate cause of the disorder.

Turning now to the mental symptoms of narcolepsy, I shall not consider those rare cases in which the disorder coexists with a major psychosis such as schizophrenia, nor shall I deal with the hallucinations which occur in attacks of sleep-paralysis (1). I shall limit myself to certain thinking difficulties commonly experienced by narcoleptics, but so unobtrusive as compared with their other complaints that they are usually ignored. Patients complain that thinking is an effort; they cannot concentrate, and they forget easily. I shall try to show that these symptoms are direct results of excessive inhibition in the brain. The following case may be considered.

A Viennese Jewess, age 44, with idiopathic narcolepsy, came to America when Hitler seized Austria. When examined four months later she complained among other things of difficulty in concentrating and of inability to put her mind to the task of learning English, saying (in German), "I can't grasp things; I can't learn; I simply can't get anything into my head; I haven't the patience to put my mind to it (learning English)." She knew only a dozen or two English words and could say nothing harder than good morning and thank you. Lack of intelligence was not the cause, for she obviously was of average intelligence.

This learning difficulty is what one might expect when the brain is unduly inhibitable. The learning of a word signifies the establishment of a new conditioned reflex. When a child is told that a certain plaything is a "ball," he begins to associate the thing with the word. A link is established between cerebral centers excited by the ball and those which activate a particular pattern of speech muscles. Each time the child, on seeing a ball, responds by saying or thinking the new word, excitations pass "across" this link, which, with practice, grows more and more "organized" till in time it functions automatically, at which time the word "ball" springs instantly to mind at the appropriate stimulus. The learning function depends on the healthiness of tissues which form the seat of countless conditioned reflexes. When these tissues are unduly inhibitable, the learning function breaks down. The tissues "tire" easily. New conditioned reflexes are established with difficulty and lost with ease; memory thus loses its tenacity.

Narcoleptic forgetfulness sometimes appears as an acute lapse of memory, in which the patient forgets some name or thing which most people would remember rather easily. A man of 41 with idiopathic narcolepsy said that one day, while driving his car, he forgot a promise to drop a passenger off at a certain corner. This lapse arose from the same causes as the learning difficulty of the previous patient: it reveals the failure to establish a stable link between cerebral centers representing the image of a certain street corner and the act to be performed on reaching it.

The patient just cited gave a remarkable example of an acute lapse of memory under emotional stress. A neighbor accidentally cut an artery, and the patient rushed her to the hospital. While the woman was being treated, the clerk asked him her name, but in his excitement he simply could not recall it, though they had been next-door neighbors and good friends for years. This abolition of a well established conditioned reflex under emotional stress reminds one of Pavlov's experience after the Leningrad flood, when he found that some of his animals, after they had been rescued from the water, lost conditioned reflexes which till then had been highly stable. I am not concerned with the mechanism whereby emotional stress leads to such a result, but merely point out that the example of the narcoleptic patient shows that a mental symptom may arise from the

inhibition of a conditioned reflex and that certain mental symptoms in narcolepsy seem to arise from the undue inhibitability of cerebral centers in that disorder.

## BIBLIOGRAPHY

1. Levin, M.: The pathogenesis of narcolepsy, with a consideration of sleep-paralysis and localized sleep. J. Neurol. and Psychopathol., **14**: 1-14, 1933.

2. ———: Military aspects of narcolepsy, with remarks on the pathogenesis of narcolepsy and on fatigue. Ibid., **14**: 124-131, 1933.

3. ———: "Crowding" of inhibition and of excitation. Ibid., **14**: 345-348, 1934.

4. ———: Narcolepsy and the machine age; the recent increase in the incidence of narcolepsy. Ibid., **15**: 60-64, 1934.

5. ———: The rôle of the cerebral cortex in narcolepsy; the classification of narcolepsy and allied disorders. Ibid., **15**: 236-241, 1935.

6. ———: The pathogenesis of cataplexy on anger. Ibid., **16**: 140-143, 1935.

7. Pavlov, I. P.: Conditioned reflexes, p. 253. Translated by G. V. Anrep. Oxford University Press, New York, 1927.

# SHELL COLLECTING AS OCCUPATIONAL THERAPY FOR PSYCHIATRIC PATIENTS

By MERRILL MOORE, M. D., Boston, Mass.

*"Bring me my Scallop-Shell of Quiet . . ."*
*Sir Walter Raleigh.*

It has been said that the most effective parent is the one who anticipates the needs of growing children and most adequately meets these needs by directing—as much as a parent can—the growth of the child. To some extent the psychiatrist is *in loco parentis* with patients who are bored, or distracted, or may be in need of some guidance in budgeting their energy expenditure. The success of occupational therapy in psychiatry is probably due to the fact that immature, unstable or neurotic individuals need something to do, someone to show them how to do it, someone to see to it that they do do it and someone to praise them for it after they have done it. But one of the difficulties of occupational therapy in the past has been that it was often too mediocre and restricted, too arty and too crafty. Instead of using only looms and weaving, or carpentry and metal work, each an excellent activity in its own right, one may wonder why the occupational therapist has not employed the ancient and honorable materials of science as well as art. Why should not treatment be made educational and diversional as well as occupational? If this could be done, all the armentaria of science might become available, with limitations of course, for therapy. And what I say here about shells could just as easily be said for flowers, crystals, fossils, insects, birds, fish and all the objects in nature. There is no end, in fact, to the materials of science and natural history or the uses to which they may be put as forms of occupational therapy and as adjuncts to psychotherapy. It all depends on the ingenuity, skill and constructive or creative imagination of the therapist and on the patient's receptivity and cooperativeness. I would like now to tell you briefly about some ways in which the study of shells can be used as a form of diversional or occupational therapy. I have chosen in this paper to discuss shells because they are the material I myself have often used in therapy and I suspect that it is important for the physician himself to have enthusiasm for the subject in order that he may successfully infect the patient with his own zeal.

The greatest problem that confronts the psychiatrist in his private practice is not the patient who is obviously insane. The handling of such a patient presents relatively few difficulties because the psychotic patient is usually best cared for in a private or public institution. A more difficult problem presents itself in the patient who is not insane but who is unable for one reason or another (usually a psychoneurosis or a neurotic personality) to make an adequate adjustment to his environment and the people in it. Such patients are able to carry on most of their customary activities, but they are often beset with problems for which they do not find the solution alone; hence they come to the psychiatrist for help. They require re-education and assistance in understanding their personality in order that they may spend their energy in ways which will be satisfactory to themselves and useful to others.

It is quite true that the best results in treating neuroses are usually found when the treatment has been prolonged, intensive and systematic and where it was started when the patient was young. But how about situations where ideal treatment is out of the question or impossible, where the psychiatrist and the patient do the best they can with limited means? In certain cases very "light" treatment (sometimes relatively few hours of therapy or several interviews) seems to produce encouraging results and may bring about favorable changes in the patient's personality, better insight or more adequate adjustments. The deeper riddles of psychotherapy are still unsolved, though it must be admitted that analytical, interpretative, inspirational, re-educational and re-integrative

approaches all converge finally on the same basic and central problems.

For the intelligent psychiatric patient the choice of a suitable form of occupational therapy may offer some difficulty. I have found that some psychiatric patients can easily become interested in conchology and that shell-collecting is a form of occupational therapy that is very desirable in certain instances. In its favor is the fact that it requires no great or specialized skill at the beginning nor any knowledge that cannot be acquired as part of the activity. The beauty of color and shape of shells makes a strong appeal to the aesthetic individual; the challenge that is offered by identification and classification appeals to the more scientifically minded. The preparation of cabinets or containers to house collections presents appealing aspects to the patient who is able to use his hands and some tools. Thus, shell collecting offers not one but several forms of occupational therapy all directed toward a single objective, helping the patient get well.

Frequently a patient may be moderately interested when the idea of shell study or collection is suggested, but his interest will not be sustained except by offering encouragement and a definite plan. One easy and natural approach can be made by keeping in the consulting room a number of good specimens of handsome shells, lying on shelves or on a table by the patient's chair. In the first interviews with the patient, no direct reference need be made to them. However, it is not unusual for the patient himself to bring up the subject in the course of the interview or to offer some comment on a particular shell. The nature of the remark often indicates whether his reaction to them is positive, negative or neutral. If his reaction is positive, or if it is neutral but it appears that he needs only a little encouragement to become more interested, he may be presented with an "introduction to conchology." This consists of a cellophane bag containing a small but perfect specimen, together with a card bearing its name, genus and habitat. On a later visit the subject of shell collecting may be brought up again and the patient can be invited to look at an interesting collection of shells. I keep such a collection in a cabinet in my waiting room for this purpose. With each succeeding visit the patient can be questioned about his shells and definite, detailed suggestions can be made from time to time. The patient may be encouraged to read some of the many interesting books on the subject, or he may be given information that will encourage him to correspond with other collectors, perhaps to exchange duplicates. A number of patients I know carry on a spirited exchange of duplicate specimens and are so much interested in shells now that they seem to have less time available to worry about some of their former symptoms. A patient's interest may be turned toward the many excellent private or museum collections, where he may verify his own shell identifications or obtain ideas about how to display and arrange them.

For collectors who have an opportunity to travel, the beaches of Florida or California are a prolific source of molluscan wealth. Sanibel Island near Fort Myers is the most southerly of a string of coastal islands and by reason of its position is favorably placed to receive the multitude of shells washed up from the Caribbean, where the shallow gulf bottom, the southerly exposure and certain currents favor the growth of molluscan life on a scale that is unique in this hemisphere. It is said that only the Great Barrier Reef of Australia and Mauritius in the Indian Ocean outrank it in the number and quality of the shells found on their beaches. Other beaches on the west and east coasts of Florida yield a great many shells, as well as the beaches of the West Indies Islands and those in and near Nassau, Hamilton and Paget's in Bermuda, St. Kitts', Santa Lucia, Trinidad and Cuba. In California, the Monterey peninsula near Carmel and Pebble Beach and farther south near Santa Barbara and Ventura are also good objectives for collectors and are sufficiently accessible to be reached quickly.

The study of shells also leads to many other fields of interest. Looking up beaches, one studies maps and discovers new places where shells come from. This may encourage an interest in geography. The colors and designs of shells offer infinite possibilities for artistic study of color arrangements. Shells contain many designs suitable for rugs or textiles. For others, shell collecting may

lead to an interest in marine life in general: fishes, crabs, sea weeds, as well as molluscs. These constitute a fascinating world in themselves.

For those, however, with limited time and pocketbook, shell collecting can be adjusted to fit the budget. In some cases material can be obtained at no cost from friends or relatives who travel and who may be persuaded to send or bring back a package of shells. Or shells can be ordered from dealers. The study and collection of shells is a form of occupational therapy that can be carried on quite independently. It requires no special equipment. Cardboard boxes for transfer purposes, a basket or a paper bag, rubber beach shoes and a hat to shade the head are all that one requires. At first a shell-collector picks up every specimen but he soon develops discrimination and passes by all but the most perfect. The number of species already known is nearly a hundred thousand; of these about a thousand species may be found on the east and west coasts of North America. A single collector can cover only a small part of the field.

Shells appeal to young and old alike. Pleasure and enjoyment may be extracted from them in the same measure as time and interest are given to them. This form of occupational therapy should not be limited to patients with neuroses. As a matter of fact, any convalescent patient or person with a chronic disability, such as heart disease, finds shells highly diverting. Children confined to a hospital or in bed at home can be amused for hours with a few simple specimens.

All beginnings are small and when one remembers that there are many types of neurotic personality and that some of these are poorly understood, it would seem that new approaches should continually be tried in an effort to create opportunities to open more doors and throw more light on the dark closed chambers that hold the ultimate secrets of neuroses.

In this respect certain basic questions remain to be adequately answered. Is a neurosis essentially constitutional in origin and nature? Or is a neurosis due primarily to old traumatic experiences? Is a so-called "nervous breakdown" due to libidinous frustration or conflict, or is it the result of physical factors such as an essentially biochemical disturbance or an endocrine glandular imbalance? Or is it simply the result of ignorance, stupidity and the waste of human energy? Possibly a neurosis may spring from any or all of these, or from conditions that are undiscovered as yet. These are questions in which all physicians, especially psychotherapists, are very much interested.

Quite naturally I would anticipate the criticism from some psychiatrists that this method of psychotherapy is superficial. I would not disagree on this point. Shell-collecting as a form of occupational therapy is not a cure-all by any means. It is, however, a special hobby which lends itself well to certain forms of psychotherapy and serves as a diversional adjunct that can be used in connection with suggestion, persuasion, catharsis and the transference situation, which it can sometimes improve. It permits the therapist to "become as a child" with the patient in a way that is desirable for certain types of patients; also it allows the therapist to assume a parental or teacher rôle which can facilitate certain types of therapy. It can give the patient a strong sense of delight and power. Thus the patient's introspective concern with his internal physical and mental environment may give way to a healthier or more balanced extraversion of interests, which sometimes makes it easier for him to develop insight, or may allow him to regard his problems in a more objective light. Some of the tensions and the bitter, aggressive attitudes of a neurotic individual assume less prominence as new interests and new perspectives develop.

Often the patient's greatest need is for a happy break in the monotonous, repeated round of daily tasks and duties. Shell collecting can provide this. There are few other collectors' items which offer so little danger of becoming routine as do shells. It is for these reasons that I feel that conchology offers many advantages as a form of occupational therapy. This is also true for other branches of nature study. Nearly everything that has been said could apply just as well to fossils, crystals, insects, minerals and other natural objects. But the collection and study of land and sea shells in particular provides a good example of how scientific material

can be utilized especially in the treatment of certain types of neurotic individuals.

## BIBLIOGRAPHIC NOTE

There is a quarterly magazine devoted entirely to conchology. It is called *Nautilus*. One can subscribe to this magazine by writing to the editor, Dr. Henry A. Pilsbry. His address is care of the Academy of Natural Science, Philadelphia, Pennsylvania.

One of the first books on the subject of shells had this title: "The Recreation of the Eye and of the Mind Through the Observation of Sea Shells." It was written by a learned Jesuit named Buonanni and was published in Rome in the year 1681.

There are many excellent modern books on shells, but no one book covers the whole field. If one wants a simple book there is "Florida Sea Shells" by Aldrich and Snyder. This is a good book for beginners. If one wants a larger and more inclusive book there is "The Shell Book" by Julia Ellen Rogers. A very satisfactory book that gives much information about American shells on the Atlantic coast is "The Sea Beach at Ebb Tide" by Augusta Foote Arnold. Also, one will find it very interesting to go to a library and look up something on the subject of sea shells or *conchology;* or, one may find information in any encyclopedia or text book of zoology under the heading *molluscs*. If one wishes to make things out of shells one may find that "Shell Craft" by M. L. Walworth contains helpful ideas.

## PRACTICAL NOTE

If one goes to New York City one should visit the Hall of Ocean Life in the Museum of Natural History on Central Park West. The Hall of Ocean Life contains one of the finest shell collections in the world, if not *the* finest in the world. There one can see the famous *Conus Gloria-Maris,* the rarest and most valuable shell that has ever been found. One can buy shells at this Museum from the Book Shop which is located in the Museum. There are other ways to buy shells. There are shell dealers in large cities who advertise in nature magazines and in other periodicals. Among the better known dealers (to name but a few) are F. H. Ward, of Ward's Natural Science Establishment, 302 Goodman Street, North, Rochester, N. Y., and Walter F. Webb, 202 Westminster Road, Rochester, N. Y. One can also get shells from Ethel Snyder, Sanibel Island, Florida, where she collects them herself, and from Mrs. F. K. Hadley, 88 Oliver Street, Malden, Massachusetts, and from Christine McArthur, in care of Brentano's, Fifth Avenue, New York City. And one can always buy shells from individuals (or swap duplicates), but the best and the most interesting way to collect shells is to go out and find them for oneself.

# USE OF AMPHETAMINE (BENZEDRINE) SULPHATE IN THE TREATMENT OF CHRONIC ALCOHOLISM[1]

By MILTON ROSENBAUM, M.D., and LOUIS LAMS, M.D.
*Cincinnati, Ohio*

The use of amphetamine (benzedrine) sulphate in the treatment of chronic alcoholism was first reported by Bloomberg(1). He was led to try this therapy because of the well-known "lift" given by the drug and because the drug was effective in relieving the "hangover" associated with alcohol. If the drug was taken before drinking it appeared to increase the ability to consume alcohol without intoxication. This report was concerned with 21 cases, in 8 of which drinking ceased completely. In 14 cases (66 per cent) the results were considered reasonably successful, and in only 4 cases was there total failure. More recently the same author(2) has reported experiences with 56 patients, including some of his original cases. Of these patients, 37 (66 per cent) improved, while 19 (34 per cent) showed little or no improvement, according to an evaluation which was not quantitative.

The original technique was to give 10 mg. of amphetamine sulphate twice a day and adjust the dose if necessary. Any attempt at formal psychotherapy was purposely avoided. However, the latter report stresses the fact that benzedrine was only used as an adjunct in the treatment régime, and that in addition the patients were subjected to a well-rounded, flexible and non-specific psychotherapeutic program, including, when indicated, personal interviews, re-education, environmental manipulation, hospitalization and general medical attention. It is interesting that in both these groups the results were about the same, namely, about two-thirds of the patients improved. As to why this happened one can only speculate. There were only two constants in each series, one the benzedrine and the other the author. Of these two the latter is perhaps the more important, and it may be that his original intention to "avoid all formal psychotherapy" was not interpreted as such by his patients.

Because of the first favorable report, a weekly clinic was instituted in the Cincinnati General Hospital in September, 1939, in which patients suffering from chronic alcoholism were treated with amphetamine sulphate. In the two years in which the clinic has been in operation only 24 patients in all attended. All these patients were referred from the psychiatric service of the Cincinnati General Hospital where they had been confined because of disabilities resulting from chronic alcoholism. The small size of this series is noteworthy, especially since all the chronic alcoholics admitted to the psychiatric service were given clinic appointments (200 patients) and also many alcoholic patients seen in the receiving ward of the hospital (at least 50 patients) were also given clinic appointments. This experience coincides with Bloomberg's(3) who was unable to establish a similar clinic at the Boston City Hospital where the number of alcoholic patients is very high, averaging 7 per cent of the total admissions(4). This is only a reflection of the well-known resistance of alcoholic patients to undertake treatment of any form, and also of their characteristic tendency to give lip service to their intentions to stop drinking.

The technique of treatment was similar to that of Bloomberg's in that the patients were started on 10 mg. of amphetamine sulphate B.I.D. and any attempt at formal psychotherapy was purposely avoided. Yet certain differences in total technique should be noted because of their importance. Bloomberg's patients were seen in his private office, ours were seen in a clinic at a general hospital; most of his patients were private, ours were all charity cases. It would seem to us that a closer patient-physician relationship was established in his cases than in ours by virtue

[1] From the psychiatric service of the Cincinnati General Hospital, and the psychiatric department of the University of Cincinnati Medical College.

Benzedrine was supplied through the courtesy of Smith, Kline and French Co.

of the physical set-up alone, even though no conscious attempt was made to develop such relationships.

## Analysis of Cases

Table I summarizes some of the more important findings in this series of 24 cases. There were 18 males and 6 females, 17 of the patients were white, 7 were negroes. The ages varied from 23 to 60 years, the average age being 38 years. They were all heavy drinkers, the years of drinking ranging from 4 to 30, with an average of 15. Probably the most important aspect of this series is that all the patients had findings which were not only characteristic of severe chronic alcoholism but also of severe alcoholic addiction. As a group they met the requirements recently laid down by Bowman and Jellink(5) for the diagnosis of chronic alcoholism and alcohol addiction. In other words, they were in a malignant phase of the disease. Thus every one of these patients had been admitted to the psychiatric service of the hospital because of some disability resulting from chronic alcoholism. The fact that 11 of the 24 patients had suffered from an alcoholic psychosis prior to treatment clearly indicates the severity of their alcoholism. Also the fact that 9 of the patients were either divorced or separated and that all the male members of the group were unemployed prior to treatment points to the severity of their personality and social maladjustment. In general they represented a group of patients from the lower stratum of society who had never made a satisfactory adjustment in life. Emphasis has been laid on the above factors so as to be able to properly evaluate results of treatment and to compare this series with others.

TABLE I

Summary of Important Findings in 24 Cases

| No. | Age | Sex | Color | Marital status | Years drinking | No. visits | Time followed | Result | Alcoholic psychosis | Length of previous remissions | Desire for help |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 21 | M | B | Single | 8 | 6 | 3 mos. | Resumed drinking | D. T.'s | 0 | + |
| 2 | 38 | F | B | Separated | 8 | 5 | 3 wks. | Unknown | D. T.'s | 0 | + |
| 3 | 34 | M | W | Divorced | 10 | 1 | 0 | Unknown | 0 | 0 | + |
| 4 | 39 | M | W | Divorced | 17 | 3 | 2 wks. | Committed to state hospital | 0 | 6 mos. | + |
| 5 | 37 | M | W | Separated | 17 | 1 | 0 | Unknown | D. T.'s | 6 mos. | + |
| 6 | 39 | M | W | Divorced | 20 | 2 | 1 wk. | Resumed drinking | 0 | 0 | + |
| 7 | 36 | M | W | Married | 20 | 2 | 1 wk. | Resumed drinking | D. T.'s | 6 mos. | 0 |
| 8 | 42 | M | W | Divorced | 24 | 2 | 1 wk. | Unknown | D. T.'s | 3 yrs. | + |
| 9 | 32 | F | B | Separated | 8 | 5 | 2 mos. | Resumed drinking | D. T.'s | 1 mo. | + |
| 10 | 40 | F | W | Single | 12 | 21 | 7 mos. | Not drinking | 0 | 9 wks. | ++ |
| 11 | 60 | M | W | Married | 30 | 13 | 6 mos. | Not drinking | D. T.'s | 4 wks. | 0 |
| 12 | 33 | M | W | Married | 5 | 2 | 2 wks. | Unknown | 0 | 18 mos. | 0 |
| 13 | 55 | M | W | Married | 28 | 1 | 0 | Unknown | 0 | 0 | + |
| 14 | 36 | M | B | Divorced | 10 | 2 | 1 wk. | Resumed drinking | D. T.'s | 0 | + |
| 15 | 30 | M | W | Single | 10 | 1 | 0 | Unknown | D. T.'s | 0 | + |
| 16 | 47 | M | B | Separated | 22 | 4 | 1 mo. | Unknown | 0 | 2 yrs. | + |
| 17 | 50 | M | W | Married | 30 | 8 | 9 mos. | Not drinking | 0 | 3 wks. | + |
| 18 | 45 | M | W | Single | 23 | 2 | 1 wk. | Unknown | Alc. hall. | 2 yrs. | + |
| 19 | 32 | F | B | Separated | 16 | 1 | 0 | Unknown | 0 | 1 mo. | + |
| 20 | 27 | F | W | Married | 4 | 3 | 2 wks. | Resumed drinking | D. T.'s | 2 yrs. | + |
| 21 | 31 | M | B | Married | 13 | 1 | 0 | Unknown | 0 | 0 | + |
| 22 | 38 | M | W | Married | 5 | 2 | 3 wks. | Resumed drinking | 0 | 1 yr. | ++ |
| 23 | 23 | F | W | Married | 7 | 2 | 3 wks. | Resumed drinking | 0 | 1 yr. | + |
| 24 | 49 | M | W | Married | 20 | 15 | 10 mos. | Resumed drinking | 0 | 1 mo. | 0 |

## Results

Of the 24 patients, only 3 have remained faithful to the treatment and have refrained from drinking. These 3 patients still return to the clinic, are working, and have gone seven, eight, and ten months respectively without resorting to alcohol. One patient had a relapse after he had refrained from drinking for ten months. Of the remaining 20 patients, 6 attended the clinic only once, 8 attended twice, and the remaining 6 attended from three to six times. For the

most part all the patients took no more than 20 mg. of the drug daily and there were no untoward effects of the drug.

## Discussion

The finding that only 3 of the 24 patients stopped drinking for fairly long periods and that one patient resumed drinking after a free period of ten months does not seem very encouraging. Yet in view of the malignant nature of the disease in the group as a whole, good results in even a few patients are noteworthy. In this connection the objection might be raised that since 14 of the 24 patients in our small series attended the clinic two times or less we really are in no position to say that benzedrine was given a fair trial. This may mean that the initiation of a benzedrine régime is not a powerful enough incentive in itself to make patients return for treatment who are not willing to do so on their own initiative. On the other hand one could say that those patients who continued to return for treatment might have done so without the use of benzedrine.

Whether or not similar results would have been obtained with the use of a placebo instead of amphetamine cannot be answered since no such control study was undertaken. Also whether or not similar, better or poorer results would have been obtained if psychotherapeutic discussions had been utilized as part of the treatment cannot be answered for similar reasons. The results in this series do not compare favorably with those reported by Bloomberg. Some points which might possibly explain this discrepancy have already been touched on. His patients were treated in the setting of a private office, ours in a clinic at a general hospital; most of his cases paid for treatment, ours were all on a free basis. The intellectual and personality assets, and the possibilities of manipulating the environment for a more satisfactory life adjustment were probably much more limited in our cases. On the whole our patients represented a more malignant group than his patients. Probably the most important factor in this respect is that a closer inter-personal relationship both between physician and patient, and physician and patient's family, existed in his cases.

Practically all authors discussing the treatment of chronic alcoholics have stressed the importance of the patient's attitude towards treatment to the point where a willingness or desire for treatment on the patient's part is of prime importance for accepting the patient for any treatment (6). Along these lines it is of interest that all of our patients, with only four exceptions, definitely asserted a strong desire for help in overcoming their drinking. This stated desire became even more meaningful when it is remembered that all the patients attended the clinic on their own initiative and without outside pressure from friends, relatives, or social workers, as far as we were aware. It seems that the importance of this so-called "desire for help" on the patient's part has been overemphasized in regard to prognosticating the outcome of treatment, especially since in our experience practically all alcoholics will violently affirm a desire to stop drinking. It simply amounts to an ease of giving "lip service" to a statement rather than a deep and sincere wish for help. All this may mean that the best indication one has as to the alcoholic's sincere "desire for help" is whether or not he remains faithful to the type of treatment used. For an alcoholic to be able to squarely face the fact that he is an abnormal drinker and to be willing to faithfully undergo treatment is in itself evidence of a certain degree of emotional maturity which warrants a good prognosis no matter what type of treatment is used.

As to the mechanism of the action of the drug in these cases one can only speculate. The feeling of "well-being" and "lift" that accompanies the use of the drug may act in some patients as a source of security by relieving certain anxieties connected with difficulties in inter-personal relationships. In others the drug may tend to combat the effects of a mild depression with which the drinking is associated. In others, and this may be the most universal factor, the psychological effect of the drug may gratify the patient's marked dependent needs (both conscious and unconscious) as does alcohol but in a less toxic manner. Certainly the action of the drug at best is only that of a substitute for alcohol. Inasmuch as there is no specific type of personality involved in alcoholism,

and no specific type of mental conflict as the underlying basis for drinking, any approach to the problem could not be limited to the administration of one drug but would need be more catholic. For example, one patient might benefit from amphetamine because it satisfies his strong dependent needs, but another patient whose drinking may be mainly in the nature of a hostile act against a member of his family might not benefit from the drug. We would agree with Bloomberg that the main value of amphetamine sulphate in the treatment of chronic alcoholism is that the free interval which the drug might produce can allow for the institution of a more fundamental psychotherapeutic régime.

## Summary

The use of benzedrine sulphate in the treatment of a series of 24 general hospital patients all suffering from severe chronic alcoholism and alcoholic addiction yielded poor results. Some of the possible reasons for these results have been discussed.

## BIBLIOGRAPHY

1. Bloomberg, W.: Treatment of chronic alcoholism with amphetamine (benzedrine) sulphate. New England J. Med., **220**: 129, 1939.

2(A). Personal communication to the authors.

2(B). Bloomberg, W.: Results in the use of amphetamine (benzedrine) sulphate as an adjuvant in the treatment of chronic alcoholism. Am. J. Psychiat., in Press.

3. Personal communication to the authors.

4. Moore, M., and Gray, M. G.: The problem of alcoholism at the Boston City Hospital. New England J. Med., **217**: 381-388, 1937.

5. Bowman, Karl M., and Jellink, E. Morton: Alcohol addiction and its treatment. Qtly. J. Studies in Alcohol, **2**: 98-176, June 1941.

6(A). Moore, M.: The treatment of alcoholism. New England J. Med., **221**: 489-493, 1939.

6(B). Alcoholics. Anonymous. New York, Works Publishing Co., 1939.

6(C). Strecker, E. A., and Chambers, F. T.: Alcohol, one man's meat. New York, The Macmillan Co., 1939.

# DYNAMIC FACTORS IN THE AFFECTIVE PSYCHOSES

## A Comparative Study [1]

By HENRY FOX, M. D., Baltimore, Md.

About 970 patients were admitted to the Henry Phipps Psychiatric Clinic between January, 1936, and January, 1940. Of these, 416 were manic-depressives or allied states. Selecting 400 because it is a convenient round number, a review has been made in an effort to clarify the nature and relative importance of the constitutional pattern.

The method has consisted in a careful evaluation of the leading dynamic factors in each case. Although we have been able to summarize our results in numerical terms we have throughout attempted to avoid any mere statistical catalog of symptoms and to retain as vivid a sense as possible for the way in which the various factors were active in the lives of the patients.

We were in a particularly favorable position to do this since the patients had so recently been in the hospital under our personal care, and in many cases we have had the opportunity to follow their subsequent development. The records, moreover, are unusually replete with careful observations made by the house staff and the nurses. Most of the cases were presented at a morning conference where all of the more experienced members of the staff were present. This provided an opportunity for critical discussion of the material and for a pooling of impressions, which tended to correct what might be too one-sided a statement as made by the house officer who presented the case. Fortunately, complete stenographic notes of these discussions were kept and we have made full use of them.

The 400 patients included a wide variety. The ages varied from fourteen to eighty. The majority were economically in the middle class and were able to pay an average of twenty-five to thirty-five dollars a week for their hospitalization. Most of them had completed at least eight grades at school and a large proportion were high school graduates or better. The cases for admission were selected to quite an extent with a view to their therapeutic plasticity so that we dealt with acute rather than chronic material. Men and women were about equal in number.

Some of the patients were only mildly involved in their difficulties, and no doubt quite a large proportion of them would in other places be considered as psychoneurotic. As patients are received in this clinic only on a voluntary basis, all were capable of giving a certain degree of cooperation. Nevertheless we had many very seriously disturbed individuals who were certainly at least as difficult to handle as any in the state hospital.

In reviewing the whole series of about 970 it was sometimes necessary to include or exclude cases as belonging to the affective group in spite of the final diagnosis made at the time of discharge from the hospital. This did not happen very often. In general we included all those patients in whom one could demonstrate a fairly definite attack or at least a reasonably clear-cut exacerbation either of pathological overactivity, underactivity or some combination of the two. Although there was great variation from case to case we measured this in terms of the evidence of an autonomous rhythm which had become more or less independent of immediate environmental influences. A morning to evening variation in mood and spontaneity, a specific sleep rhythm with a tendency to early awakening, and evidences of vegetative involvement such as loss of weight and appetite, gastro-intestinal alterations such as constipation, decrease in libido or potentia, amenorrhea, and prolonged alterations in the pulse rate were used as means of differentiating these cases from the psychoneurotics which were characterized chiefly by poor use of essentially normal function. Well established and rhythmically

[1] From the Henry Phipps Psychiatric Clinic, The Johns Hopkins Hospital.

This study was made possible by the help of the John and Mary R. Markle Foundation.

variable difficulties in thinking and concentration were regarded as important evidence that the patient was suffering from a fairly sweeping type of reaction and therefore belonged to this group. No patients were included in whom there was fairly definite evidence of personality disorganization. The following table gives the numerical relationships between the group selected for study and all the other patients admitted to the clinic during the same period.

| | No. of patients |
|---|---|
| Manic-depressive and allied states | 416 |
| Schizophrenia | 185 |
| Psychoneurosis | 168 |
| Primarily organic reactions | 84 |
| Psychopathic personality | 68 |
| Delirium | 31 |
| Intermediate | 20 |
| Total | 972 |

In going over the 400 selected records we attempted to avoid preconceived diagnostic categories. What seemed to be the most important dynamic factors were culled out and arranged according to their relative importance for the understanding of the particular case. As these summaries accumulated, certain items repeatedly emerged. These were listed. After they had amounted to more than thirty or forty it became evident that they could be grouped under certain general headings and subheadings as follows:

## Manic-Depressive Reactions and Allied States

### Leading Factors

I. Largely Reactive. (85)
- a. Reactive to personal conflicts (for instance, breaking or wanting to break personal ethical code as to financial or sexual behavior). (15)
- b. Largely situational and beyond patient's control (includes physical disease, postpartum and post-operative settings, financial losses, personal disappointments, etc.). (144)
- c. Bereavements. (17)
- d. Promotion depressions. (4)
- e. Where strong hereditary factors also play a leading rôle in the environmental dynamics (*e. g.*, suicide of parent or sibling, reaction to psychotic behavior of blood relatives). (10)

II. "Thymopathic." (64)
- a. Elations and depressions at different times during the patient's lifetime. (42)
- b. Repeated depressions where the known precipitating factors are apparently of minor importance. (1)
- c. Depressions with sadness and slowing in more or less pure culture. Includes marked retardation and depressive stupor; also manic stupor. (2)
- d. Cyclothymic (primarily psychopathic make-up with ups and downs). (18)
- e. "Hyperthymic"—(by which is meant a tendency to repeated episodes of over-activity with no, or at least comparatively few, depressive periods). (15)
- f. *Ups and downs in closed cycles* (which may or may not be followed by recovery. In some cases an underlying paranoid development, in other cases turning on a special personal preoccupation). (7)

III. Individual Personal Make-Up, Attainments and Attitudes largely determining the character of the reaction. (85)
- a. In setting of inadequate or *poorly realized personal goals* ("psychopathic" constitution, "schizoid" or "sensitive" or rigid make-up, also in dependent, impulsive, "immature" personalities. This group includes adolescent or delayed adolescent settings. Also futility feelings with apathy). (See also Psychopathic Personality, where—in contrast to these cases—the depression is incidental rather than leading.) (75)
- b. In setting of *regret and discontent* (more or less chronic dissatisfaction with the personal environment). (24)
- c. Where *aversion* or *resentment* are prominent. Patients who adopt a stubbornly "hopeless" attitude are included in this group. Also included are patients with a tendency to rut formation (but not necessarily with any demonstrable organic changes)—often with "involutional" coloring. (24)
- d. "Individual" psychoses (recurrent psychotic episodes similar in character and not easily understood under other groupings—may include various sorts of excitement, often with schizoid coloring). (3)
- e. In poorly organized personalities because of youth (under 16) or because of insufficient original endowment (oligergasic). (12)
- f. Where alcoholism and drug addiction are prominent features (where the alcoholism, though subsidiary to the affective reaction, is none the less more than merely incidental). (16)

IV. Anxiety, Apprehension, Tension, their physiological accompaniments and their interferences with thinking and concentration. (62)
- a. *Apprehension, anxiety and anxious hypochondriasis* (includes many of the "agi-

tated" depressions. Also includes many of the so-called "menopausal" states. Anxiety features include rapid pulse, lump in throat, anxious anticipation, etc.). (106)

b. With marked *tension* ("band" around head, pain in neck, gastric ulcers, rapid pulse, itching. Also *"psycholeptic" episodes,* frequently followed by unreality feelings). (48)

c. Where thinking and concentration difficulty (subjective or objective) becomes a leading issue—also depressive "confusion" and "bewilderment." (11)

V. More or Less Topical Focus Rather Than Directly Affective Expression. (36)

a. Worrying and harping *hypochondriasis* (with quasi delusional interpretations such as cancer, insanity, etc.). Also syphilophobia. Also concern over harmful effects of masturbation. Also pregnancy fears (with guilt). (35)

b. *Depersonalization,* also numbing, unreality and nihilism. (Depersonalization is understood to include delusions of poverty, feeling in a void, as well as feelings of loss of more personal functions such as taste, bowels, hair, etc. Also "lost soul," damnation.) (43)

c. Turning on the loss of body part (teeth, hair, sex organs, etc.) to which special personal significance is attached. (1)

d. Dissociative dysmnesic elements. (9)

e. Features suggesting at least temporary personality disorganization (schizophrenic)—includes passivity and odd somatic preoccupations. (18)

VI. Obsessions, Tics, Marked Indecision (in setting of depressive *tension*). (17)

a. *With obsessions.* (23)

b. *Tics.* (2)

c. Where *indecisiveness* is the principal feature. (4)

VII. Projection Tendency. (32)

a. With panic (and often paranoid suspicion). (32)

b. Marked *sensitiveness* and *suspicion* (even with ideas of persecution). Also dissimulation of the affect—sometimes with aggressiveness. (51)

VIII. Structural or Humoral Factors. (19)

a. With admixtures determined by acquired organic deficit (arteriosclerosis, chronic alcoholism, paresis). (17)

b. Toxic features. (17)

c. Following infectious illness (particularly influenza—also in setting of endocrin dyscrasia. Hyper- and hypo-thyroidism, diabetes, etc.). (18)

d. In setting of fatigue (overwork, insufficient sleep). (3)

e. Complicated by poor physical health, operations or serious physical disabilities. (78)

After a first review of all 400 cases this grouping of the leading factors was completed and we then went over all the material a second time. This gave us the opportunity to record the way in which these items found actual illustration in each clinical record. It was soon found that a hard and fast division of the patients under the eight headings of the outline could not be made. Although it was almost always possible to determine which of the eight chief factors was the leading issue, the only way that justice could be done to the material was also to record subsidiary factors from other groups when they played an important part in the patient's illness. This method makes possible a comparative study of the various leading issues of importance in the whole group and at the same time to retain an appreciation of their relative importance in each case.

The degree of cross reference as well as the relative frequency of the various factors is indicated by the numbers which appear in the outline above. The figures appearing after each of the main headings refer to the total number of cases in which that particular factor was the dominant issue. The numbers after the subheadings, on the other hand, indicate the total number of patients in the whole series in whom this specific subheading was active, whether or not it was the leading issue. A summary of this cross referencing of factors is demonstrated in the following chart where the headings show the way in which the 400 patients were primarily divided into the eight groups, under which is indicated the extent to which factors in any one of the seven other leading groups *beside* the dominant one also played a part in the production of the patient's clinical picture.

As the work progressed it became evident that even in those cases where the manic-depressive constitutional tendency was clearly evident it did not emerge as an independent disease entity. We have spoken of it as the thymopathic factor in order to emphasize its rôle as one among a number of other factors and varying in importance from case to case. There were very few patients indeed in whom it was the sole factor and, as can be seen from the chart, other issues played an important, if subsidiary, rôle in a great many cases. The

| | Leading factors | Reactive | Thymopathic | Make-up | Anxiety | Topical | Obsessive | Projection | Structural |
|---|---|---|---|---|---|---|---|---|---|
| 85 | Largely reactive | .. | 6 | 5 | 34 | 15 | 3 | 6 | 29 |
| 64 | Thymopathic | 20 | .. | 15 | 5 | 12 | 1 | 24 | 7 |
| 85 | Make-up | 11 | 5 | .. | 24 | 9 | 4 | 6 | 19 |
| 62 | Anxiety | 29 | 1 | 16 | .. | 2 | 2 | 6 | 20 |
| 36 | Topical | 12 | 7 | 4 | 10 | .. | 1 | 7 | 10 |
| 17 | Obsessive | 4 | 3 | 8 | 4 | 2 | .. | .. | 5 |
| 32 | Projection | 15 | 2 | 8 | 5 | 9 | .. | .. | 6 |
| 19 | Structural | 8 | .. | 1 | 10 | 3 | 1 | .. | .. |
| 400 | Totals | 99 | 24 | 57 | 92 | 52 | 12 | 49 | 96 |

thymopathic tendency was considered to be unmistakable when patients demonstrated a capacity for affective shifts to manic excitement as well as depression. In the whole series of 400 there were only 83 patients in whom there was an excitement or a history of an excitement. Most of the 64 patients included in the thymopathic ("manic-depressive") group had excitements or a history of an excitement although there were a few in whom what seemed to be a primarily endogenous tendency was demonstrated in a depressive phase only. Mere instability of mood with easy and rapid oscillations in the emotional tone falls short of the thymopathic tendency which includes the capacity for a reasonably prolonged organization of the personality along affective lines. Thus we are considering a certain type of mood and content synthesis.

The chart above brings out certain relationships of the thymopathic factor to the other factors involved. The thymopathic group is seen to be relatively separable from the anxiety and the obsessive groups. This is indicated by the comparative paucity of cross references. Of the 64 primarily thymopathic patients, for instance, only 5 had subsidiary anxiety features and only one had obsessive trends. Furthermore, of the 62 patients in whom anxiety was the primary issue, only one had subsidiary thymopathic tendencies and only 3 of the 17 obsessives had thymopathic tendencies.

On the other hand, the thymopathic group is intimately related to the reactive elements, the personal make-up, the topical trends, and particularly the tendency to projection. As can be seen from the chart 24 of the 64 patients in whom the thymopathic factor was dominant had projection features and 20 of the 64 had important reactive elements. These findings have a direct bearing on treatment and will be discussed below.

In comparing the thymopathic group with the others, the heredity and the habitus were given consideration in view of their bearing on the question of constitutional make-up. We rather expected that the thymopathic group would show a greater tendency to the pyknic type and that the family histories would show a greater incidence of excitements or depressions in near relatives. Actually this did not turn out to be the case. About one-third of the primarily thymopathic patients had one or more relatives with a history of an excitement or a depression but consideration of all the rest of the cases showed that in them too there was an incidence of only slightly less than one-third with a similar family history. This would seem to be a particularly interesting finding in the patients whom we are considering because of the very fact that the whole group of 400 includes so many patients who would in other places be diagnosed as psychoneurotic. The results concerning the habitus were also rather surprising. In only 55 of the 64 thymopathic patients was the habitus recorded but in addition to some intermediate groups there were 20 asthenics, 16 athletics, and only 13 pyknics. Of the 301 remaining patients in whom the habitus was recorded there were 118 asthenics, 72 athletics, and 82 pyknics. Proportionately, therefore, the pyknic habitus occurred, if anything, *less* frequently among the thymopathic patients. In evaluating these observations, however, one must take into account the fact that the assignment of the patients to the various Kretschmerian types was made by the house physician in charge of the patient and was in most instances the outcome of a general clinical impression rather than based on actual measurements.

Finally, the thymopathic group was compared to the others in regard to two very practical issues, namely suicidal risk and outcome. Quite a number of the patients mentioned suicide at one time or another and of the whole group 98 patients made actual attempts at suicide. Only 12 of these were patients in the thymopathic group, so that the incidence of such attempts in this group of 64 was only 17 per cent whereas it was 25 per cent among the rest of the 336 patients.

Since the patients in this series have been in the clinic so recently, some of them having been discharged within the past year, evaluation of the outcome is not nearly as significant as it will be after more time has elapsed. At the time of discharge, 327 patients were classified as improved, 73 unimproved. Of those in whom the thymopathic factor was dominant 55 were improved—an incidence of 86 per cent as compared with 81 per cent of the remaining 336 patients.

## Summary of Findings

1. Of the 400 cases studied only 83 (about 21 per cent) had an excitement or a history of an excitement.

2. In 64 patients the thymopathic factor was the dominant one. Most of them had excitements or a history of an excitement although there were a few in whom what seemed to be a primarily endogenous tendency was demonstrated in a depressive phase only.

3. The primarily thymopathic group was to a large extent separable from the obsessive and the anxiety groups.

4. The thymopathic factor is on the other hand intimately related to the reactive elements, the personal make-up, the topical trends and particularly the tendency to projection.

5. More than $\frac{1}{3}$ of the primarily thymopathic cases showed projection. Less than $\frac{1}{3}$ of all the rest of the cases showed this.

6. One-third of the thymopathic cases had one or more relatives with a history of excitement or depression. Only slightly less than $\frac{1}{3}$ of all the rest of the cases had the same heredity.

7. Of the 55 primarily thymopathic patients in whom the habitus was recorded, there were 20 asthenics, 16 athletics and 13 pyknics. Of 301 other patients in the group in whom the habitus was recorded there were 118 asthenics, 72 athletics and 82 pyknics. The pyknic type was, if anything, proportionately less frequent in the primarily thymopathic group than among the rest of the patients.

8. Of the 400 patients, 98 made actual attempts at suicide. Only 12 of these belonged to the thymopathic group so that the incidence of such attempts in this group of 64 was only 17 per cent whereas it was 25 per cent among the remaining 336 patients.

9. Of the 400 patients selected, 230 had a history of previous depressions or elations. Of the 64 thymopathic cases, 52 had such a history, in other words an incidence of 81 per cent as compared with 53 per cent of the remaining 336 cases.

10. Of the 400 patients 327 were discharged as improved. The rest were unimproved. Of the 64 thymopathic patients 55 were discharged as improved—an incidence of 86 per cent as compared with 81 per cent of the remaining 336 patients.

## Discussion

The above findings have a very direct bearing on our concepts of treatment. Since the constitutional pattern even among the fairly "pure" manic-depressives (the primarily thymopathic) is found to be only one factor among others rather than a disease entity, our attitude toward the patient is determined accordingly. Actually we work with a balance attempting to do full justice to the vital details of personal biography without losing sight of the pathological pattern to which they belong. This balance is destroyed when the reaction is regarded as a "self-limiting" attack which tends to over-isolate the experience from the patient's general biographical stream. Rather than slurring over whatever constitutional factors may be present they can be given their place in the picture without allowing them to attract more attention than they actually require.

Greater specificity concerning the actual

working factors is most desirable. In taking the history of an affective disturbance we attempt to determine the degree to which we are dealing with an attack clearly demarcated from the patient's previous experience. This varies widely from case to case. In some patients one feels that it is really forcing the issue to speak of any very clear cut attack and that at best one is dealing with an exacerbation of longstanding attitudes and behavior patterns. Such considerations have an important bearing on the evaluation of the unquestionably brilliant therapeutic results of shock treatment and would perhaps indicate the particular usefulness of such agents in those cases presenting primarily a behavior rut in which the patient has been caught and where lifelong personal attitudes and characterological liabilities seem to play a relatively minor rôle.

As has been shown above, of the 64 patients in our thymopathic group, 24 showed a well marked tendency to projection at one time or another. There were in addition (in the group of 400) 32 patients in whom projection and panic were the leading features of an essentially effective illness. Taken individually many of these symptoms could easily have led us astray; and the records of these patients emphasized the shortcomings of any merely statistical enumeration without regard for the more general personal setting. Members of relatively unsophisticated cultural groups, for instance, are often lacking in the capacity for a critical differentiation of their personal projections from the real outer world—as in the negroes who seem to have hallucinations and religious visions with relative ease. The same holds true of psychotic developments in the feebleminded where there are so often very florid projections which readily subside with the achievement of greater emotional stability. A schizoid type of individual, moreover, may in an affective illness develop peculiar somatic complaints or even feelings of influence and victimization. Such manifestations in this type of personality would not, however, necessarily be indicative of any progressive disorganization of the personality but might simply represent a temporary exacerbation of that particular individual's ordinary make-up. The physician who allows himself to become too much involved in the details of the delusional projection under such circumstances is apt to be much less helpful to the patient than he would be if he placed the treatment emphasis on the patient's inner feelings of disturbance and discouragement.

A review of a series such as this, moreover, brings one to a greater appreciation of the features which constitute the most important common denominator of the whole group. We have found that changes in sleep rhythm, loss of weight and appetite, gastrointestinal variations, amenorrhea, and loss of libido are important indicators of the depth and quality of involvement; but to isolate such factors from the psychobiological pattern to which they belong leads one away from the most effective grasp of the patient's real problem. We felt closer to the heart of the problem by observing the changes in the patient's self-feelings which showed themselves in a variety of ways ranging from such ethical evaluations of the self as, for instance, worthlessness, to a feeling of simple motor inhibition and retardation felt as subjective "slowing" and loss of initiative. In the manic-depressive and allied states self evaluation is greatly affected. But although the individual may feel overwhelmed he still for the most part retains an appreciation of the direction flow of forces coming from outside himself as contrasted to those originating from within. This appreciation persists in spite of his tendency to project his feelings and it remains a vital asset upon which the physician can rely during treatment.

## Conclusions

1. The thymopathic factor (manic-depressive constitutional tendency) is one among a number of other dynamic factors in the production of manic-depressive and allied psychoses rather than representing an independent disease entity.

2. Although hereditary and other more or less static constitutional factors undoubtedly play a very definite rôle, their influence is of a general nature. One gets closer to an understanding of the particular patient's illness by studying the way in which these largely non-specific factors have been woven into a personal constitutional pattern.

# THE INSANITY PLEA IN MURDER [1]

By CHARLES A. RYMER, M.D., Denver, Colo.

In this paper we wish to discuss certain procedures which, although within the letter of the law, have in a certain sense frustrated the spirit of the law. From the outset it should be understood that we have no reason to recommend any type of punishment in these cases. Our sole interest is to analyze the unique legal and psychiatric procedures which are used to free the defendant from facing the full responsibility for his acts. We are not concerned with any consideration of the McNaughten rules and their subsequent influence on legal thought, the historical development of the plea of insanity, a philosophical discussion of the concepts of right and wrong, or a review of the idea of lessened responsibility as applied to the defendant. Such a discussion is to be found in excellent articles by Overholser(4), (5), Zilboorg(6), Kennedy(3), Karpman(2), and others.

The material for this paper is based on the study of 63 murder cases examined under a law which permits the defense of insanity in any criminal offense. Following the entrance of this plea, each of the cases was confined in our hospital for a period of observation from 10 days to one month. A report was furnished to the court setting forth the hospital's opinion of the mental state of the defendant. Since the enactment of this law in 1927, 482 offenders of all kinds have entered the plea of insanity as a defense. Of these, 141 or 29 per cent were found to be insane, 341 or 71 per cent were found to be sane (Table I). Of the 63 cases charged with murder, 22 or 35 per cent were insane and 41 or 65 per cent were found sane.

As a rule, little legal controversy was encountered in those cases found to be suffering from a mental disease. The defense attorney and the district attorney were willing to accept the hospital's findings and dismiss the criminal charge against the defendant and try him on the issue of insanity only. In these cases a witness from the hospital appeared in court for the defendant and testified as to the nature of his psychosis. Only in two cases (14 and 24, Table II) was there a conflict in opinions. In each of these cases the community's temper was so aroused by the nature of the crime that the district attorney's office refused to accept the hospital's opinion and tried the defendant as charged. A witness from the hospital still appeared for the defendant and testified to the nature of the defendant's psychosis. Data on these cases found insane are shown in Table II.

TABLE I

1927 Law Court Cases

| | Sane | | Insane | | |
|---|---|---|---|---|---|
| | No. | Per-centage | No. | Per-centage | Total |
| 8/1/27 to 7/1/28 | 16 | 57.14 | 12 | 42.85 | 28 |
| 7/1/28 to 7/1/30 | 37 | 74.00 | 13 | 26.00 | 50 |
| 7/1/30 to 7/1/32 | 35 | 62.50 | 21 | 37.50 | 56 |
| 7/1/32 to 7/1/34 | 31 | 60.80 | 20 | 39.20 | 51 |
| 7/1/34 to 7/1/36 | 43 | 56.58 | 33 | 43.47 | 76 |
| 7/1/36 to 7/1/38 | 74 | 76.29 | 23 | 23.17 | 97 |
| 7/1/38 to 7/1/40 | 91 | 86.66 | 14 | 13.33 | 105 |
| 7/1/40 to 1/1/41 | 14 | 73.68 | 5 | 26.31 | 19 |
| Total | 341 | 70.80 | 141 | 29.20 | 482 |

In the majority of cases found to be sane after adequate study by the hospital, the defense and prosecution accepted the hospital's findings without question and proceeded under due process of law—usually the defense changed the plea to merely "not guilty" and stood trial. Table III shows the hospital's diagnosis and findings in these cases as

[1] Read at the ninety-seventh annual meeting of The American Psychiatric Association, Richmond, Virginia, May 5-9, 1941.

From the Colorado Psychopathic Hospital, University of Colorado School of Medicine and Hospitals, Denver.

well as the nature of the crime, its cause, and the jury's disposition of the case. However, in 8 of the 41 cases accused of murder and reported sane at the time of the crime, difference between right and wrong and his ability to refrain from doing the wrong. (These cases are marked "contested" in Table III.) It is of interest that this differ-

TABLE II

TO SHOW THE FINDINGS ON PSYCHOTIC PATIENTS STUDIED UNDER THE 1927 LAW

| Case No. | Age | Diagnosis | Hospital report to court | Type of crime | Cause | Disposition by jury and court |
|---|---|---|---|---|---|---|
| CASES IN WHICH JURY DID NOT FOLLOW HOSPITAL RECOMMENDATION | | | | | | |
| 14 | 49 | Schizophrenia, paranoid type. | Insane. | Killed wife and 3 children by saturating clothing with gasoline and lighting with match. | Delusions of persecution. | Guilty of first degree murder and sentenced to death. |
| 24 | 20 | Psychosis with mental deficiency. | Insane. | Killed playmate by hanging. | ? | Guilty of first degree murder. Later transferred to State Hospital because of psychosis. |
| CASES IN WHICH JURY FOLLOWED HOSPITAL RECOMMENDATION | | | | | | |
| 2 | 52 | Mental deficiency with psychosis. | Insane. | Killed 2 men by shooting. | Felt employers had tried to cheat him out of $18. | Committed to State Hospital. |
| 12 | 32 | Schizophrenia, simple type. I. Q. 32. | Insane. | Killed wife, shot her 6 times. | Delusions of infidelity toward wife. | Committed to State Hospital. |
| 17 | 43 | Schizophrenia, paranoid type. | Insane. | Killed neighbor with shotgun. | Felt neighbor had involved patient's niece in white slave traffic. | Committed to State Hospital. |
| 18 | ? | Senile psychosis with depression. | Insane. | Killed wife, tried to shoot self. | Senile irritability. | Committed to State Hospital. |
| 19 | 27 | Schizophrenia, paranoid type. | Insane. | Killed neighbor by shooting. | Delusions of reference, influence. Felt controlled by "passion dope." | Committed to State Hospital. |
| 21 | 50 | Schizophrenia, paranoid type. | Insane. | Killed neighbor by shooting. | Delusions of reference. | Committed to State Hospital. |
| 27 | 79 | Senile deterioration, with cerebral arteriosclerosis. | Insane. | Killed county farm superintendent by shooting. | Delusions of persecution. | Committed to State Hospital. |
| 30 | 44 | Psychosis with mental deficiency. Alcoholic deterioration. | Insane. | Killed innocent bystander to a quarrel. | ..... | Committed to State Hospital. |
| 32 | 70 | Psychosis with cerebral arteriosclerosis, paranoid trend. | Insane. | Killed employer with axe. | Delusions of persecution. | Committed to State Hospital. |
| 33 | 45 | Schizophrenia, paranoid type. | Insane. | Killed stepfather with gun. | Delusions of persecution. | Committed to State Hospital. |
| 34 | ? | Schizophrenia, paranoid type. | Insane. | Killed brother with gun. | Delusions of persecution. | Committed to State Hospital. |
| 37 | 40 | Schizophrenia, paranoid—chronic alcoholism. | Insane. | Killed 84 year old man who shared same jail cell. | Delusions of persecution. | Committed to State Hospital. |
| 40 | 68 | Psychosis with cerebral arteriosclerosis. | Insane. | Killed son with a gun. | Delusions of persecution. | Committed to State Hospital. |
| 41 | 60 | Psychosis with cerebral arteriosclerosis. | Insane. | Killed common-law wife by shooting. | Delusions of persecution and influence. | Committed to State Hospital. |
| 43 | 14 | Psychosis with mental deficiency. | Insane. | Killed sheepherder by shooting. | Delusions of influence. | Committed to State Hospital. |
| 45 | 41 | Syphilis of the central nervous system, general paresis. | Insane. | Killed employer by shooting. | Delusions of reference. | Committed to State Hospital. |
| 47 | 58 | Paranoid state. | Insane. | Killed official of company, some of whose stock he held. | Delusions of persecution. | Committed to State Hospital. |
| 50 | 61 | Cerebral arteriosclerosis with psychosis, paranoid trend. | Insane. | Killed neighbor by shooting. | Delusions of persecution. | Committed to State Hospital. |
| 52 | 50 | Psychosis with mental deficiency. | Insane. | Killed man who tried to disarm patient. | ? | Committed to State Hospital. |
| 62 | 31 | Schizophrenic reaction, paranoid type. | Insane. | Killed acquaintance by shooting. | Delusions of persecution. | Committed to State Hospital. |

the defense took exception to the hospital's report and chose to maintain the plea of not guilty by reason of insanity, either permanent or temporary, but usually temporary. In these cases the court contest centered around the defendant's knowledge of the ence in psychiatric opinion has arisen in those cases only in which the crime was one punishable by death. Of these 8 cases in which a conflict arose over the defendant's sanity, the jury substantiated the hospital's findings in 5 cases. None of the contested

## TABLE III

### To Show the Findings on Sane Patients Studied Under the 1927 Law

| Case No. | Age | Hospital diagnosis | Report to court | Type of crime | Cause | Disposition by jury and court |
|---|---|---|---|---|---|---|
| **CASES IN WHICH JURY DID NOT FOLLOW HOSPITAL RECOMMENDATION** | | | | | | |
| 39 Contested. | 17 | Normal individual, hysterical. | Sane. | Killed husband by shooting. | Provoked by husband annulling the marriage. | Found temporarily insane and acquitted of crime. |
| 51 Contested. | 42 | Normal individual, hysterical. | Sane. | Killed wife and hired man with axe, tried to suicide. | Quarreled with wife. Question of wife's committing adultery. | Found temporarily insane and acquitted of crime. |
| 54 Contested. | 39 | Mental deficiency. | Sane. | Killed newborn by cremation. | Baby did not belong to husband. | Found insane by jury. Sent to State Hospital, but later released because sane. |
| **CASES IN WHICH JURY FOLLOWED HOSPITAL RECOMMENDATION** | | | | | | |
| 4 | 27 | Hysterical reaction. | Sane. | Killed wife by shooting. | Claimed she would not leave him alone. | First degree murder. Sentenced to death. |
| 6 | 32 | Mental deficiency. | Sane. | Killed recluse with hatchet. | Robbery. | First degree murder. Sentenced to death. |
| 13 | 58 | Hysterical reaction (feigned insanity). | Sane. | Killed two men by shooting. | Quarrel over ownership of alfalfa. | First degree murder. Sentenced to death. |
| 53 | 32 | Normal individual. | Sane. | Killed wife by shooting. | Marital trouble. | First degree murder. Sentenced to death. |
| 56 | 27 | Normal individual. | Sane. | Killed proprietor of beer tavern. | Robbery. | First degree murder. Sentenced to death. |
| 8 | 35 | Mental deficiency. | Sane. | Killed sister-in-law. | Jealous of sister-in-law. | First trial: First degree murder. Sentenced to death. Second trial: Second degree murder. Sentenced to life in penitentiary. Third trial: Involuntary manslaughter. Sentenced to 3 to 5 years in penitentiary. |
| 16 | 21 | Normal individual. | Sane. | Killed policeman. | Robbery. | First trial: First degree murder. Sentenced to death. Second hearing: Plead guilty to second degree murder. Sentenced to 65 years to life in penitentiary. |
| 55 Contested. | 28 | Mental deficiency. | Sane. | Killed wife by shooting. | Quarrelled with wife. | First trial: First degree murder. Sentenced to death. Second trial: First degree murder. Sentenced to life in penitentiary. |
| 59 | 41 | Psychopathy with alcoholism. | Sane. | Killed wife by beating. | Quarrelled with wife. | First trial: First degree murder. Sentenced to death. Won new trial on technical error. Second trial: First degree murder. Sentenced to life in penitentiary. |
| 1 | 33 | Constitutional psychopathic inferior, borderline intelligence. | Sane. | Killed two men by shooting. | Quarrelled over woman. | Second degree murder. Sentenced to 20 to 25 years in penitentiary, paroled after serving 5 years. |
| 3 | 38 | Normal individual. | Sane. | Killed lover by shooting. | Lover had continued to spurn her. | First degree murder. Sentenced to life in penitentiary. Paroled after 8 years. |
| 5 | 40 | Mental deficiency. | Sane. | Killed common-law wife. | ? | Second degree murder. Sentenced to 10 to 40 years in penitentiary. |
| 7 | 58 | No psychosis, beginning cerebral arteriosclerosis. | Sane. | Killed acquaintance by shooting. | Claimed theft of money by deceased. | Second degree murder. Sentenced to 20 to 30 years in penitentiary. |
| 9 | 40 | Normal individual. | Sane. | Killed female business partner by shooting. | Quarrelled over finances of business. | Voluntary manslaughter. Sentenced to 1 to 8 years in penitentiary. Paroled in 18 months. |

TABLE III—CONTINUED

| Case No. | Age | Hospital diagnosis | Report to court | Type of crime | Cause | Disposition by jury and court |
|---|---|---|---|---|---|---|
| 10 | 19 | Normal individual. | Sane. | Killed proprietor of store. | Robbery. | First degree murder. Sentenced to life in penitentiary. |
| 11 | 20 | Mental deficiency. | Sane. | Killed nightwatchman. | Robbery. | First degree murder. Sentenced to life in penitentiary. |
| 15 | 24 | No psychosis, borderline intelligence. | Sane. | Killed father by shooting. | Family quarrel. | Second degree murder. Sentenced to 10 to 20 years in penitentiary. |
| 20 | 22 | Constitutional psychopathic inferior. | Sane. | Killed girl friend by shooting. | Quarrelled with girl friend. | First degree murder. Sentenced to life in penitentiary. |
| 22 | 58 | Mental deficiency. | Sane. | Killed wife by crushing body. | Quarrelled with wife. | Voluntary manslaughter. Sentenced to 3 to 5 years in penitentiary. Paroled in 17 months. |
| 23 | 22 | Mental deficiency. Alcoholism and marihuana addiction. | Sane. | Killed man by stabbing. | ? | First degree murder. Sentenced to life in penitentiary. |
| 25 | 47 | Normal individual. Limited intelligence. | Sane. | Killed uncle by shooting. | Claimed uncle had cheated him of his share of the farm. | Second degree murder. Sentenced to 18 to 30 years in penitentiary. |
| 26 | 49 | Normal individual. | Sane. | Killed wife by shooting. | Claimed wife lost interest in him and showed him no affection. | First degree murder. Sentenced to life in penitentiary. |
| 28 | 53 | Constitutional psychopathic inferior. | Sane. | Killed wife by shooting. | Claimed wife treated him badly, and threatened him with gun. | First degree murder. Sentenced to life in penitentiary. |
| 29 | 30 | Constitutional psychopathic inferior. | Sane. | Killed son three and one-half years old by slapping him. | Became provoked at boy. | First degree murder. Sentenced to life in penitentiary. |
| 31 Contested. | 26 | Normal individual (feigned insanity). | Sane. | Killed close friend who owed him money. | ? | Second degree murder. Sentenced to 10 to 20 years in penitentiary. A trusty at prison. |
| 35 | 37 | Hysterical reaction with amnesia. | Sane. | Killed stepfather by shooting. | Stepfather got court order restraining defendant. | Voluntary manslaughter. Sentenced to 1 to 5 years in penitentiary. Served 7 months. Paroled for good behavior. |
| 36 | 33 | Normal individual. | Sane. | Killed common-law wife by shooting, tried to suicide. | Felt wife paid too much attention to two old bachelors. Became jealous. | Second degree murder. Sentenced to 25 years in penitentiary. |
| 38 | 29 | Constitutional psychopathic inferior. Question of alcoholism. | Sane. | Killed aunt by shooting. | Became irritated with aunt. | Second degree murder. Sentenced to 50 years to life in penitentiary. |
| 42 Contested. | 55 | Normal individual. Question of alcoholism. | Sane. | Killed neighbor by shooting. | Neighbor tried to borrow some money. Defendant refused and deceased is supposed to have threatened defendant. | Second degree murder. Sentenced to 12 to 15 years in penitentiary. |
| 44 | 12 | Reactive behavior disorder. | Sane. | Accomplice to murder. | ..... | Children's Village, New York. |
| 46 | 16 | Normal individual. | Sane. | Killed wife's lover by shooting. | Wife refused to live with defendant. | Second degree murder. Sentenced to 20 years to life in penitentiary. |
| 48 | 44 | Normal individual with history of alcoholism. | Sane. | Killed wife by striking her. | Defendant claimed wife seeing other men. | First degree murder. Sentenced to life in penitentiary. |
| 49 | 15 | Normal adolescent boy. | Sane. | Killed father by shooting. | Deceased quarrelled with wife. Question of father's faithfulness to wife. | Sent to Catholic Home (Father Flanagan's, Omaha, Nebr.). |
| 57 | 35 | Normal individual. Question of alcoholism at time of crime. | Sane. | Killed proprietor of hotel by shooting. | Asked proprietor for girls and when refused shot proprietor. | Second degree murder. Sentenced to 10 to 20 years in penitentiary. |
| 58 | 38 | Normal individual. Question of alcoholism. | Sane. | Killed friend by striking him with axe handle. | Quarrelled with friend for telling a falsehood. | Involuntary manslaughter. Sentenced to 1 to 14 years in penitentiary. |
| 60 Contested. | 40 | Normal individual. Reactive depression over crime. | Sane. | Killed wife by shooting. | Wife unfaithful to defendant. | Second degree murder. Sentenced to 10 years to life in penitentiary. |
| 61 | 33 | Normal individual. Question of alcoholism at time of crime. | Sane. | Killed wife by shooting. | Marital trouble. | First degree murder. Sentenced to life in penitentiary. |
| 63 Contested. | 48 | Normal individual (claimed alcoholic amnesia for crime). | Sane. | Killed deputy sheriff by shooting. | Quarrelling preceded shooting. | First degree murder. Sentenced to life in penitentiary. |

cases received the death penalty, and as a rule their sentences were somewhat lighter than those for persons committing comparable crimes.

It is this small group of 8 cases which forms the nucleus of this discussion. As we study these cases we see that certain legal and psychiatric practices make it possible for a defendant to avoid punishment in keeping with the magnitude of his crime, even murder, through winning a direct acquittal by being found not guilty by reason of temporary insanity or through receiving a very light sentence. The various devices through which this end is achieved may be tabulated as follows:

1. Technicalities which forbid mental examination of defendant immediately following the crime.
2. Qualification of jury—especially in cases of capital punishment.
3. Use of the insanity plea;
   a. To show mitigating circumstances.
   b. To raise question of defendant's ability to know right from wrong, or refrain from doing the wrong.
   c. To raise question of irresistible impulse.
   d. To show existing amnesia and absence of intent.
   e. To raise question of mental condition.
   f. When no other defense is plausible.

This classification is artificial since there can be no strict delineation of the factors which the defense may seize upon for the benefit of his client, and it may be necessary to use every suggested method. It is interesting to examine each of these devices in greater detail.

(1) Various technicalities now forbid the examination of a person immediately after the commission of the crime before the plea of insanity is raised. For example, in one of our contested cases (no. 63), the results of the examination were not admitted as evidence. The psychiatric examination had been completed shortly after the murder and in reality amounted to a confession by the defendant. However, the court ruled that any information gained by the hospital before the plea of not guilty by reason of insanity was offered could not be recited in open court, since the defendant had been placed in a position of testifying against himself, as he had not surrendered his constitutional rights through the plea of insanity.

The Briggs law in Massachusetts provides for a routine psychiatric examination of all cases of capital offense, felony and recidivism, whether a plea of insanity is made or not, preferably immediately after the crime. An early examination would do much to throw light on the state of mind and personality organization of the so-called normal murderer. No one imagines that in the average case of murder the murderer is calm, composed, peaceful or law abiding. Quite to the contrary, he may be excitable, distraught, agitated, perplexed, angry, yet a long way this side of a frank psychosis, even temporary as often later contended. Any delay in the examination serves merely to strengthen the defense through forgetfulness on the part of the defendant, or a crystallization of ideas by the counsel.

The psychiatrist who represents the prosecution is often placed in the position of a district attorney as he examines the defendant in an attempt to obtain an accurate idea of what happened at the time of the murder. He must attempt to discover the defendant's actions and thoughts, degree of awareness, level of consciousness, and what he did and said at the time of the crime.

The psychiatrist who is asked to examine the defendant some weeks or months after the murder is given a Herculean task to determine whether the defendant did or did not know right from wrong, or just what his state of mind was at the time of the crime. We believe that the physician should be allowed to testify from his examination made immediately following the crime, and that this procedure should become general. However, if an immediate examination is to be made, two obstacles must be overcome; the first, the ruling that the defendant gives testimony against himself by this procedure; the second, that such an examination violates the traditional privileged communication idea.

(2) One of the most interesting procedures is the qualification of a so-called "death jury." As the individual juror is called upon to voice his opinion regarding

capital punishment, the defense has a powerful weapon which can be employed if any juror expresses opposition toward the death penalty. Should a potential juror state that he would not take another man's life, the defense in questioning this juror can put the questions in such a way as to impress the other jurors, who have already been qualified and who may not be adverse to the death penalty, that they would be taking a drastic step in invoking the death penalty. This use of suggestion can go a long ways in bringing about a serious doubt in the minds of the other jurors as to the validity of their own opinions. The prosecution may prove its case conclusively by the evidence it presents and may rightfully expect the jury to invoke the death penalty, but this preliminary discussion showing that other potential jurors would under no consideration invoke the death penalty cannot be dismissed lightly as having no effect upon the minds of the jury. The jury may be willing to find the accused guilty of first degree murder and fix the penalty at life in the penitentiary, but to invoke the death penalty—very seldom.

(3) The plea of insanity, especially temporary, is used as a defense in a number of ways.

(a) This defense is frequently used to introduce various mitigating circumstances. In the average criminal proceedings, mitigating circumstances are not admissible as evidence, but when the question of insanity is raised, some courts allow experts to testify to any facts or conditions which may have some bearing on the defendant's mental condition. The defense counsel is usually aware of what can be admitted as evidence and frequently is able to unfurl the defendant's entire life story to the jury through the psychiatrist. This story may take on two different aspects either of which can influence the jury. Either the defendant has lived such a good life that the crime would be impossible in the absence of temporary insanity, or he has lived under such deplorable circumstances that his mind snapped, blocked, or "went out" *temporarily* for the duration of the crime. Such reasoning gives every law-abiding citizen the privilege of committing at least one murder in his life, especially if he can get the sympathy of the public and the press.

In these cases the plea of temporary insanity may be of some value to the jury since it offers a means of escape. We have seen a few cases in which the jury refused to consider the sentence of first degree murder, since the nature of the crime was such that it was at least partially justifiable. On the other hand, the defendant could not be acquitted since this would reflect on the soundness of the jury's deliberations. In these cases, an escape via the plea of temporary insanity makes a happy solution. It is easy for the jury to reason, in such cases, that the verdict was sound. After all, they argue, the reputation or previous life of the defendant was such that he must have been "crazy" at the time.

(b) As a defense to a crime there are few stronger pleas than the one that the defendant did not know the nature of his crime due to his temporary loss of mind. If this temporary disturbance is accepted as a valid defense without any evidence of pre-existing mental abnormality, we merely invite murder and prepare a way out for the defendant. What type of reasoning is it that permits a psychiatrist to testify to this sudden loss of mental control during which the defendant commits a crime? What is this condition, what is its pathology, and in what circumstances does it occur? These questions can be answered easily by saying that it is a non-existent condition, arising from a defect in the law which allows such a questionable defense to be made, and it is being used in any murder case lacking a better defense. It should puzzle us that the defendant always engages in highly coordinated actions which led to the homicide rather than indulging in another form of behavior while under the influence of his temporary insanity. Why should the temporarily insane person always shoot and kill; why shouldn't he stand on his head instead?

(c) The law has specified that rage, anger and heat of passion are not to be confused with the so-called irresistible impulse, and the temporary insanity plea is sometimes used to show irresistible impulse. The use of this defense only serves to confuse the jury. Obviously many defendants may say, "I couldn't keep from doing what I knew to be wrong." Presumably in the truly psy-

chotic, irresistible impulse may exist, but it is unlikely that this is the case in the normal. Man keeps himself under fair control even in situations which are difficult, and when this control begins to slip, as it were, the irresistible impulse is usually not its first manifestation. There are many evidences of his instability which identify him as frankly psychotic long before a murder is committed.

(d) The plea of temporary insanity is often used to show amnesia or absence of intent to kill. It is not uncommon to examine a defendant who insists that he suffers an amnesia for the crime and is therefore not guilty by reason of being without intent to kill. In these cases the defendant can relate a clear, concise, coherent story up to a few seconds before the murder at which time things "go blank" for him or there is a breaking or blocking in his mental processes. Obviously to forget the exact details of the murder are important for the defendant. If the psychiatric testimony is handled cleverly enough, the jury may be more than amenable to dismiss the murder charge. A popular plea of the day is the amnesia resulting from the use of alcohol. It is well known that alcohol cannot be used as a defense to a crime, but if it can be shown that the defendant was under the influence of alcohol to the point of not knowing what he was doing at the time of the crime, then the degree of punishment can be lessened. Frequently psychiatric opinion can be purchased to testify to the fact that the defendant was in a state of alcoholic amnesia, irrespective of the degree of his drinking. In every murder, the defendant probably does a few unusual things; a recital of these serves to strengthen the testimony that the defendant was suffering from an alcoholic amnesia. To establish any amnesia as a defense to a crime again paves the way to murder without punishment.

(e) The plea of temporary insanity is also used as a means of raising the question of reasonable doubt as to the defendant's mental condition. If the counsel for the defense can raise enough doubt in the minds of the jurors that the defendant did not know what was happening at the time of the murder, a valuable point is won. While the jury members may not consider finding the defendant temporarily insane and granting him his freedom, enough doubt may be raised in their minds to cause them to return a verdict involving less than the death sentence.

(f) Frequently attorneys make use of the plea of insanity simply because they have no other defense at that moment. There is always the possibility that the defendant *might* be psychotic and therefore should not be made to stand trial for a crime he had no intent to commit. Moreover, defense lawyers often seem to believe that the defendant had to be temporarily incapacitated to commit the crime. Finally, the plea of insanity is often made purely to delay the trial. Time is a valuable weapon in the hands of the defense, for many things may happen, to wit: witnesses for the state may leave, the public's attitude may change toward the defendant, or the type of defense may become clearer to the counsel.

## Discussion

The psychology of the jury is an important factor in the use of the insanity plea. Rarely does a jury desire to bring in a death verdict in the average murder case. Catton(1) points out that juries refuse to invoke the death penalty: in 1937 of 7500 criminal homicides committed in the United States only 1.8 per cent of the criminals were executed by the state. Jury members have no desire to condemn another man to death even though the prosecution has shown intent, premeditation, malice, and forethought in the murder beyond a reasonable doubt. The most powerful ally the defendant has is each juror's tendency to identify himself with the defendant and to visualize himself doing much as the defendant did. If this identification is carried far enough, the jurors individually and collectively will vote for the verdict they would like to hear if they were in the defendant's place.

No matter what purpose the plea of temporary insanity serves, it is sure to confuse the jury. This is especially so when the psychiatric testimony is so divergent. Naturally the defense invites this confusion and pays well for testimony which has a chance of confusing the real facts as to the defendant's state of mind. It would not be

surprising if juries in these cases would refuse to bring in a verdict, since they can well argue that if the experts cannot agree, how can the jury members be expected to decide which testimony is correct?

Even though some of our criticisms have been levelled at various legal practices used in murder cases, our chief concern is the abuse which psychiatrists allow to be made of the plea of insanity. Only too often the psychiatrist is a mere pawn in the hands of the attorneys, who with the best interests of their clients in mind, want psychiatrists to differ in open court and to give conflicting testimony. We have no criticism of the use of the insanity plea as a defense to a crime in bona fide cases. Our major objection is the increasing abuse of the plea under the heading of "temporary insanity."

Undoubtedly there are certain mental conditions which exhibit acute manifestations of a temporary nature, but these can scarcely be classed as temporary insanity. In all of them there has been some previously existing basis for the appearance of the temporary condition. For example, acute states of epilepsy, alcoholism, schizophrenia, or other psychiatric phenomena arise from conditions of relatively long standing or at least with a definite history of previous difficulty of some degree.

Inviting whatever criticism may come, we do not believe that the defense of temporary insanity is a valid one, since it is our opinion that such a condition does not exist. We believe that this defense is used solely to escape punishment for the crime. We suggest that if society wishes to excuse the act of murder under certain circumstances, a more outright formulation be made of the conditions under which murder is legal.

## BIBLIOGRAPHY

1. Catton, Joseph: Behind the scenes of murder, p. 34. W. W. Norton and Co., New York, 1940.

2. Karpman, Ben: Criteria for knowing right from wrong. J. Criminal Psychopath., **2**: 376-386, Jan. 1941.

3. Kennedy, Foster: The psychiatrist's responsibility to the criminally insane and to society. J. A. M. A., **110**: 634-639.

4. Overholser, Winfred: The place of psychiatry in the criminal law. Psychiat. Quart., **10**: 197-223, 1936.

5. Overholser, Winfred: Psychiatry and the law—cooperators or antagonists. Psychiat. Quart., **13**: 622-638, 1939.

6. Zilboorg, Gregory: Misconceptions of legal insanity. Am. J. Orthopsychiat., **9**: 540-553, 1939.

# PSYCHIATRY IN MASSACHUSETTS

By HARRY C. SOLOMON, M. D., Boston, Mass.

Massachusetts is an ancient Commonwealth in the American scene, as a result of which she can proudly point not only to historical shrines and mementoes of the beginning of the nation, but also to a long period of organized effort to care for the mentally ill. Thus, McLean Hospital opened its doors for the reception of mentally ill patients in 1818, and not long thereafter, what is now the Worcester State Hospital, was established. Two other factors in addition to the age of this community have played important parts in the development of psychiatry in Massachusetts, namely, the comparatively small area of the Commonwealth, with a dense and stationary population, and its educational and medical facilities.

Because of the age factor for the last score and more of years, little energy has had to be devoted to building projects. This does not mean that there is no over-crowding; unfortunately, there is; or that new buildings have not been added. But, the latter have been relatively few, and more often for functional improvement rather than major expansion. The energy thereby saved from expenditure for planning and constructing has been available for the improvement of general functioning, for training personnel, for standardization and systematization.

The close proximity of the institutions has led to exchange of ideas, frequent meetings of staff members, comparisons, consultative opportunities, and centralized control. The nearness of colleges to the hospitals has had material advantages. Some of our hospitals have been used as teaching centres for psychology and psychopathology, thereby bringing the academic and cultural facilities and the healthy student spirit into our premises. Aid in problems dealing with physics, chemistry, sociology, psychology, statistics, has been readily obtainable. Three Class A medical schools located in Boston challenge the teaching abilities of our mental hospital staffs, and act as a stimulus for study, foster a spirit of research, and offer a reward by academic titles for work accomplished.

It may be concluded that the above-mentioned conditions have a profound influence on the development of psychiatry in Massachusetts, and that the general situation is different in many other parts of the country, and similar in others. But it is with these facts in mind that the visiting psychiatrists might well view our local conditions.

The state hospital buildings can hardly be presented as a matter of distinct pride, from the standpoint of modern mental hospital architecture. For those interested in the last word of structural advance, the advice must be to look elsewhere. The Metropolitan State Hospital of Waltham, about ten miles from Boston is Massachusetts' most recent complete hospital building project and does present a carefully thought out scheme for the care of long-continuing mental illness. The psychiatric building at the Boston State Hospital is a good example of a modern receiving unit and its research building is worthy of study. The research building at the Wrentham State School is unique for a school for the feebleminded. The Worcester State Hospital is noteworthy, among other things, for its development of a large research service in an old structure of the Kirkbride type. The Foxborough State Hospital possesses a fine modern building constructed for the care of the mentally ill with tuberculosis. The Medfield State Hospital is constructed on the cottage plan, and furnishes a nice contrast to the several block-type hospitals. The Gardiner State Hospital has specialized in facilities for the care of chronic patients of the type fit for colony treatment. Perhaps these examples illustrate the point that there is much of interest in our state institutions from the building aspect even though not new showplaces.

There are seventeen state institutions for the care and treatment of mental disease and defect and epilepsy, three of which are schools for the feebleminded, and one for epilepsy. The three state schools are of a high-grade of excellence, living up to the

standards pioneered by the late Walter E. Fernald, and of course, showing progress in their recent development. The Monson State Hospital is one of the few institutions in America devoted to epilepsy.

During the course of time, the care of mental disease and its effects has become a state function, and in this field, state medicine has attained a more definite status than in any other division of medicine. Further, there has occurred a centralization of control of this work in the Department of Mental Health, which, according to the statutes, is authorized to exercise supervision of public and private institutions caring for the mentally ill, the feebleminded, epileptic, persons addicted to the intemperate use of narcotics and stimulants.

A Commissioner, appointed by the Governor, with the consent of his Council, has exclusive supervision and control of the Department. In order to avoid appointments to this position on a purely political basis, the statute states that the Commissioner must be a diplomate in psychiatry of the American Board of Psychiatry and Neurology, Incorporated, and must have had several years of administrative experience.

According to the General Laws, the more important functions of the Department are as follows:

1. The efficient, economical and humane management of its institutions.
2. Establishment of by-laws and regulations with suitable penalties for the government of its institutions.
3. Establishment of salaries of officers and employees of state institutions in compliance with the law.
4. Inspection of fire apparatus and fire drills of employees.
5. Selection of sites for new state institutions and land, with the approval of the Governor and Council.
6. Direction of the designing and construction of new buildings.
7. Establishment and maintenance of free mental hygiene clinics.

For carrying out of the many duties of the Department, a number of Divisions have been created, with a Director in charge. These Divisions, and their primary duties are listed below:

A. The Medical Division—in charge of the Assistant Commissioner.

Duties:

1. Direction of examination of prisoners.
2. Supervision of transfer and deportation of patients both by the Department and by the Immigration Officials.
3. Administration of the release of unrecovered patients to other states and under special statutory conditions.
4. Promulgation of standard procedures, policies and rules and regulations for the hospitals, initiation of legislative procedures affecting the Department and hospitals.
5. Direction of personnel matters.
6. Maintenance of records of official departmental decisions.
7. Special investigations.

B. Division of Hospital Inspection.

Duties:

1. Inspection of all public and private mental hospitals and schools.
2. Recommendations to Commissioner regarding the relicensing of persons who operate private institutions.
3. Investigation of alleged illegal maintenance of private mental institutions.

C. Division of Mental Hygiene and Research:

1. Establishment, maintenance and supervision of mental hygiene clinics.
2. Direction and supervision of mental hygiene education.
3. Direction and coordination of research in the Division and all institutions of the Department.
4. Habit clinics.

D. Division of Mental Deficiency and Statistics.

(a) Statistics:

1. Preparation of statistics for annual report of Commissioner.
2. Preparation of statistics for mental hospitals and schools.
3. Maintenance of master file of patients in all mental hospitals and schools.

(b) Mental Deficiency:

1. Advisory supervision of traveling psychiatric school clinics.
2. Maintenance of central registry of mental defectives.
3. Supervision of mental defectives in community.
   - Committed.
   - Voluntary.
   - Wage placements
   - Family care placements.
   - Training home prior to wage placement.
   - Supervision special class pupils.
   - Home training lessons.
   - Advisory supervision.

E. Pathological Division.

1. Analyses of autopsies, suicides and serious casualties.
2. Investigations, analyses and reports of sudden deaths.
3. Performance of autopsies for hospitals during absence of staff pathologist.
4. Research.

F. Financial Division.

1. Development of budget.
2. Control of appropriation costs.
3. Operation of accounting system for department.
4. Financial inspection of hospitals.
5. Market observations.
6. Financial research.
7. Food coordination.
8. Farm coordination.
9. Preparation and correlation of requisitions.
10. Supervision of bids and contracts.
11. Engineering, caring for repairs and renewals, repairs ordinary, heat and power, specials and inspections.

G. Division of Settlement and Support.

1. Investigation of financial standing of patients.
2. Investigation of deportation and importation cases.
3. Administration of matters of probate leading to collection of funds for support.

As may be deduced from the above, the Commissioner has a tremendous power placed in his hands. Although the superintendents of the state hospitals are appointed by trustees, to whom they are responsible, the appointment can be made only with the consent of the Commissioner, who therefore holds a veto power, and the Commissioner has the authority, with the consent of the Governor, to declare an emergency and remove any superintendent for cause. In the care of the mentally afflicted in Massachusetts, therefore, a great deal depends upon the caliber of man selected for Commissioner.

In the present administration, an effort is made to share the responsibility of workable plans under the centralized control by the appointment of advisory committees, made up in large degree of superintendents of the hospital, but including other members, even some not directly in the state employ. The main advisory committees of the Commissioner are given herewith:

1. Committee on Personnel and Regulations.
2. Committee on General Maintenance.
3. Committee on Nursing.
4. Committee on Mental Hygiene and Public Relations.
5. Committee on Statistics and Forms.
6. Committee on General Medical Care.
7. Committee on Research and Scientific Publications.
8. Committee on Student Activities exclusive of Nursing.
9. Committee on Veterans Bureau Relations.
10. Committee on Private Hospital Relations.
11. Committee on Defense.

As a result of centralized control, a great many factors in the management of the state hospital properties and functions can be mapped out to the advantage of the local hospital authorities. Thus, specifications for supplies, proper evaluation of costs, engineering assistance relating to heat, sewage disposal, planning for new buildings, the efficient care of farms and dairy herds, the transfer of products grown on the farms, printing of forms, the collection of fees for the care of patients, the transfer of patients from hospital to hospital, and many other matters can be looked after by highly skilled professional personnel, as would not be possible if each hospital worked as an independent unit. Certain standards are set up concerning methods of examination and treatment, the amount and quality of food given patients, the pay and hours of work of employees, and many other functions of the hospital.

As in all types of centralized authority, there are many outstanding advantages and unquestionably defects as well. Whether stifling of initiative, standardization of methods, irritations caused by decisions made at a distance, and other potential faults of central control are overwhelming disadvantages, cannot be easily or readily evaluated. At any rate, the Massachusetts system is a nice example of a thoroughly organized centralized control, and the manner of its functioning should be of interest.

For many years attention has been given to the development of professional personnel. Under the Massachusetts system, as it has grown up, the higher positions such as superintendent, assistant superintendent, clinical director, have been filled very largely by members of the medical staffs of the hospitals who have worked their way up from junior positions. The rule has been for each of the hospital trustees to select a member

of the state professional personnel to fill a vacancy for superintendent rather than going outside the state; and similarly, the superintendents in appointing physicians for top ranks, have chosen them from among state hospital physicians. This has not been done, it should be noted, on the basis of seniority alone, but largely on an evaluation of the person selected. Thus, there has been a very marked interchange of men and women from one hospital to another, as vacancies occur.

Great care and attention has been given to training assistant superintendents for superintendent positions, in part by having them come into the headquarters of the Department as assistants to the Commissioner, and thereby getting a broad view of the entire state system and its problems; and partly in the most recent period, by offering training in administrative functions through lectures and conferences. In addition to the training for administrative duties, there has been strong pressure on the professional workers to enhance their clinical and investigative capacities. The higher positions are offered only to diplomates of the American Board, thus stimulating men and women to qualify in their specialty. For a number of years a refresher course has been offered at the Metropolitan State Hospital, that prepares well for the examination and offers a general review of neurology, neuropathology, neurophysiology and psychiatry. Research and investigative efforts have been strongly stressed. Under the ægis of an Advisory Committee on Research, a Research Society has been created and has acted as a fine ferment for research ambitions.

Extra mural activities have been actively developed in Massachusetts. Travelling diagnostic clinics have been established in almost every hospital, which work in conjunction with the Department of Education, and examine retarded children in the school system as well as being consulted frequently by the schools concerning students who present behavior and emotional problems. The hospitals also maintain out-patient clinics in cities and towns adjacent to them. In some instances these clinics are located in community hospitals; in other instances, in office space. They are open not only to patients discharged after care in an institution, but to the general community, and usually work in close association with the social agencies of the community. Both child guidance clinics and clinics for adults are maintained. At the Worcester clinic, this is a full-time enterprise with psychiatrists, psychiatric social workers and psychologists only very loosely connected with the state hospital. This type of work not only offers service to the community in relation to the emotionally disturbed, but does much to spread psychiatric and mental hygiene principles to the general population. Probably more important is the stimulus and opportunity afforded to staff members who are enabled to understand the problems outside of the hospital, and to deal with the milder ambulatory cases.

The mixing of the state hospital physician in community medicine brings the private physician, the social agencies, courts, probation officers and general population into a good relationship with psychiatric efforts. As a result of all this, the state hospital physician is very frequently called upon to lecture before both professional and lay groups. Further, as has been previously mentioned, because of the number of colleges, social work and medical schools in Massachusetts, the staff members have many opportunities in teaching and academic positions. I believe it is a fair statement that the past thirty years have seen a most marked change in the activities and interests of the state hospital doctor. From having been a rather isolated individual working exclusively within the limits of an institution with little contact with the outside world, he now has become a specialist with wide contacts offering him a chance to go in the direction that his talents and interests direct. The result has been that highly trained and capable young doctors have sought mental hospital training and have been afforded a real medical career.

In addition to the mental hospitals and clinics belonging to the state system, Massachusetts has two Veteran Administration hospitals for the care of mentally disabled veterans. One is located at Bedford, some fifteen miles from Boston, and one at Northampton, about ninety miles distant. These hospitals are good examples of the facilities offered by the Veterans Administration.

Organized psychiatric service is offered by three of the general hospitals in Boston; namely, Massachusetts General Hospital, Beth Israel Hospital, and Peter Bent Brigham Hospital. The Massachusetts General Hospital has a ward service for the temporary care of mental problems arising in the hospital, and especially for investigative problems relating to mental disturbances. It also has a large and active out-patient department. The other two hospitals have no bed service, but in addition to out-patient work, they offer consultative and therapeutic facilities for patients in the hospital. In all three instances, much attention is given to psychiatric teaching to the resident staff and to the younger visiting physicians.

The Washingtonian Hospital is an interesting institution devoted to the treatment of alcoholism. There are a number of private mental institutions, all of which are licensed and supervised by the Department of Mental Health. The question often arises concerning the advisability of state inspection and supervision of private mental hospitals. I believe that the hospitals in Massachusetts would not be willing to give-up this type of control, but look upon it as of great value.

Massachusetts has a Mental Hygiene Society as a private enterprise. It is worthy of note that this Society, in its Metropolitan activities, is supported by the Community Federation. This is indicative of the position it maintains in Boston.

The Judge Baker Guidance Centre, organized years ago by Drs. William Healy and Augusta Bronner, is, of course, one of the outstanding services of its kind. It has trained and continues to train, many physicians and social workers for work with problems of children, and has had a special relationship with the juvenile court. Other courts in Massachusetts avail themselves of psychiatric service, notable among which is the Boston Municipal Court, which has two full-time psychiatrists attached to it.

Several of the Family Welfare Societies in this area have consultant psychiatrists attached to their staffs for the training of their workers and for consultation about special problems among their clientele. A number of colleges located in Massachusetts, offer psychiatric diagnosis and treatment to their student body. Among these may be mentioned Harvard University, Massachusetts Institute of Technology and Wellesley College.

# SCHIZOPHRENIA AMONG PRIMITIVES

## The Present Status of Sociological Research [1]

By N. J. DEMERATH, M. A., New Orleans, La.

Those psychiatrists whose theoretical under-pinnings have been derived principally from the formulations of Freud, Jung and Meyer have for some time viewed schizophrenia as an essentially psychogenic disorder. More recently, sociologists and ethnologists have concerned themselves with the problem which this conception poses for them, implicitly emphasizing as it does the social and cultural determinants of human behavior. Realizing that psychogenesis is to a large extent ultimately sociogenesis,[2] they have attempted to demonstrate by comparative methods the sociological backgrounds of the schizophrenic reaction. Their research falls into two general categories: (1) ecological analyses of area rates for modern American cities;[3] and (2) studies of the incidence of schizophrenia in various primitive (non-literate) societies. Here we shall be concerned with the latter investigations.[4]

The idea that the functional pathologies are the peculiar curse of civilized man, while the primitive enjoys perfect psychic health except for the inevitable organic mental "diseases," is no longer tenable. An extensive literature assembled by field-working specialists provides ample evidence that the simpler peoples are more complex than the travellers and arm-chair experts of another day were wont to believe, and that psychogenic aberrations are by no means absent among them.[5] Indeed, it seems likely that for some primitive groups the rates are very nearly as high as those for the rural United States in recent years.[6] It is important to note, however, that symptomatologies differ from one culture to the next, and certain disorders such as "Piblakto Insanity," "Latah," "Amok," and the "Witiko Psychosis," found in one society will be non-existent elsewhere.[7]

For the most part, students of comparative psychopathology in general, as well as of schizophrenia in particular, have sought merely to establish the presence or absence of the relevant phenomena in various societies. Among those who report an absence or paucity of schizophrenia are Faris, who declares he found the disorder to be very rare, and perhaps absent, among the Forest Bantu (Africa).[8] However, like so many other students of the problem, Faris offers

[1] From the department of sociology, Newcomb College, Tulane University, New Orleans, Louisiana.

[2] We do not mean to imply that sociological factors are "first causes," and thereby become involved in the sterile argument over which discipline —psychology, biology, sociology—is "basic." Instead, it is simply maintained that most behavior which psychiatrists and psychologists describe as psychogenic, is on further analysis seen to be influenced by the behavior and expectations of other people.

[3] S. A. Queen, "The Ecological Study of Mental Disorders," American Sociological Review, 5: 201-209, 1940. R. E. L. Faris and H. W. Dunham, Mental Disorders in Urban Areas, Chicago, 1939.

[4] Faris and Devereux have presented partial summaries of the ethnological material. However, the present study is justified by virtue of the fact that it is more exhaustive, and at the same time represents an attempt to ferret out some of the weaknesses of the researches rather than an effort to confirm any sociological hypothesis. Cf. R. E. L. Faris, "Some Observations on the Incidence of Schizophrenia in Primitive Society," Journal of Abnormal and Social Psychology, 29: 30-31, 1934; George Devereux, "A Sociological Theory of Schizophrenia," The Psychoanalytic Review, 26: 315-342, 1939.

[5] Kimball Young presents the most complete summary of the relevant material that has appeared to date. See his Personality and Problems of Adjustment, New York, 1940, pp. 721-738.

[6] Ellen Winston, "The Alleged Lack of Mental Diseases among Primitive Groups," American Anthropologist, 36: 234-238, 1934.

[7] J. M. Cooper, "Mental Disease Situations in Certain Cultures," Journal of Abnormal and Social Psychology, 29: 10-17, 1934; F. H. G. Van Loon, "Protopathic-Instinctive Phenomena in Normal and Pathological Malay Life," British Journal of Medical Psychology, 8: 264-276, 1928; J. M. Cooper, "The Cree Witiko Psychosis," Primitive Man, 6: 20-24, 1933; Ruth Landis, "The Personality of the Ojibwa," Character and Personality, 6: 51-60, 1937.

[8] Ellsworth Faris, "Culture and Personality among the Forest Bantu," in The Nature of Human Nature (by the same author), New York, 1937, pp. 278-288.

precious little information as to methodology. How long he was in the field, and to what extent he was aware of the difficulties of such research remain unanswered questions.[9] He merely states that he ". . . . made inquiries of four large hospitals . . . ." where no records of such cases existed and where the staff did not remember any; and in the villages ". . . . attempts were made to describe the symptoms to the natives, but no comprehension of such disorders was found." [10] Lopez reports no schizophrenia in the Brazilian interior, the few psychotics found there being essentially cycloid instead of schizoid.[11] Seligman also reports cycloid disorders for New Guinea, but none which were truly schizoid.[12] However, as with Faris, Lopez' and Seligman's observations are open to question because of the all-important methodological information which is not provided.

In disagreement with the aforementioned studies are the reports of Hummer and and Laubscher. Hummer believed schizophrenia to be one of the most frequently hospitalized disorders among American Indians. Hebephrenic Indians, he writes, have the same delusions, laughter, silliness, lack of initiative and apathy as do whites. Likewise, catatonic cases show alternating periods of stupor and excitement, stereotypes, mutism, negativism, etc.[13] Hummer's data are virtually worthless, however, because he disregarded acculturation and its associated psychic conflicts as factors in the psychopathology of one-time non-literates. It is most unlikely that even a majority of Hummer's "insane Indians" were true primitives, especially since his study was restricted to hospitalized cases.

Laubscher's study of the South Eastern Cape Bantu (Africa), the Tembu tribe in particular, deserves more detailed consideration inasmuch as the author evidences greater awareness of the crucial methodological issues, and presents a lengthier report than do the others.[14] It is Laubscher's conclusion that cultural differences do not affect the structure of the reaction enough to make it something different from that which occurs in European societies, though he is well aware of the fact that ". . . . the cultural pattern to which the native belongs determines the nature of his mental content." He declares, "I think I have produced evidence in this book which points to the 'soma' as the ground for primary consideration—in other words, the study of the individual's constitution." [15] Moreover, it is his conclusion that schizophrenia occurs more frequently in this society than any other psychopathological condition.[16]

Actually, Laubscher has by no means established the primary importance of constitutional factors in schizophrenia, and there are several criticisms which may be made of his work. In the first place, as Devereux has noted, Laubscher's schizophrenic diagnoses are debatable in many instances.[17] In spite of the fact that he says that the period of psychic abnormality (*ukutwasa*) prerequisite to the development of the mediumistic powers of the shaman (*isanuse*) is by no means synonymous with schizophrenia, and in spite of the fact that the shaman status carries a great deal of prestige ". . . . resulting in a host of charlatans professing to have supernormal powers . . . . ," [18] Laubscher concluded that schizophrenia existed wherever *ukutwasa* was reported by

[9] The methodological problems involved in comparative psychopathology, such as the definition of abnormality, have been discussed by A. I. Hallowell, "Culture and Mental Disorder," Journal of Abnormal and Social Psychology, 29: 1-9, 1934; D. Katz and R. L. Schanck, Social Psychology, New York, 1938, pp. 539-544; Ross Stagner, Psychology of Personality, New York, 1937, pp. 416-444; and Kimball Young, op. cit. The writings of Ruth Benedict and Ralph Linton should also be consulted. See John Gillin, "Personality in Preliterate Societies," American Sociological Review, 4: 681-702, 1940, for an excellent general bibliography.

[10] Ellsworth Faris, op. cit., p. 288.

[11] C. Lopez, "Ethnographische Betrachtungen über Schizophrenie," Zeitschrift für die gesamte Neurologie und Psychiatrie, 142: 706-711, 1932.

[12] C. G. Seligman, "Temperament, Conflict and Psychosis in a Stone Age Population," British Journal of Medical Psychology, 9: 187-202, 1929.

[13] H. R. Hummer, "Insanity among the Indians at the Asylum for Insane Indians, Canton, So. Dak.," in H. M. Hurd (editor), The Institutional Care of the Insane of the United States and Canada, Baltimore, 1916, I, p. 391 et passim.

[14] B. J. F. Laubscher, Sex, Custom and Psychopathology, London, 1937.

[15] Ibid., p. 11.

[16] Ibid., p. 231.

[17] Devereux, op. cit., p. 317.

[18] Laubscher, op. cit., pp. 31-32.

the relatives of those afflicted.[19] Secondly, although he found a greater prevalence of schizophrenia among negros, civilized and primitive, his conclusion that this fact [20] indicates an inherited somatic basis is discredited by his fallacious assumption that he has studied a truly non-literate people,[21] and by his failure to take account of the adjustment difficulties which beset the negro in Euro-American societies. Thus, while Laubscher's data reflect the probable importance of sociological elements in the etiology of schizophrenia, in his haste to demonstrate a somatic basis for the disorder, he has made no analysis of them.

Other investigators reporting the presence of schizophrenia have recognized that the societies studied were not truly primitive, but on the contrary were either traditionally literate, or had been exposed to Euro-American culture. The presence of the disorder in India has been comparatively well substantiated. Shaw found a high rate for the Parsis of Bombay, an urban trading people.[22] Dhunjiboy, confirming Shaw's finding, reports that schizophrenia is second only to manic-depressive insanity in India and is especially prevalent among the more highly westernized Anglo-Indians, Parsis and educated Bengalis.[23] In Brazil, while Lopez found no schizophrenia among the true primitives of the interior, he did find the urbanized natives along the coast suffering from the disorder.[24] With respect to Malaya, Kraepelin wrote some years ago, ". . . . a visit to the institution in Singapore at once showed me that in the most different constituent parts of the mingling of nations there, among Chinese, Tanils, Malays, there were clinical pictures to record which wholly resemble the forms of dementia præcox known to us." [25] In another hospital in Singapore, Kraepelin believed he found that almost eighty per cent of the patients presented pictures ". . . . about which it could scarcely be denied that they belonged to dementia præcox." [26] Other students of Malayan psychopathology do not explicitly mention schizophrenia, and it is not clear whether they found it or not.[27]

Mead states that Manus wives (Admiralty Islands, Melanesia) sometimes behave in the introvertive, regressive manner which we associate with schizophrenia.[28] This behavior, she suggests, occurs in reaction to the wife's semi-reject status in the husband's family and village where she is never considered a full-fledged member. Moving out of the primary groups of her childhood and into a strange environment when she marries, she frequently develops feelings of isolation and difference. Among the six cases of mental disorder which Mead observed in Samoa, there were a thirty year old man with systematized delusions of grandeur and persecution that might have been diagnosed as schizophrenic, and a fourteen year old boy described by Mead as feeble-minded and (?) schizophrenic.[29] No attempt is made to relate these disorders to sociological elements, as in the case of the Manus material. Contrary to what might be expected, however, Mead does say that ". . . . Samoan culture, before white influences, was less flexible and dealt less kindly with the individual aberrant. . . . . The Samoans have only taken such parts of our culture as made their life

[19] Ibid., p. 229 and Appendix.

[20] For the sake of argument we may accept Laubscher's statement as a fact, even though Faris contends that the negro rate in comparison with the white rate may be high in some societies and low in others. See R. E. L. Faris, "Some Observations on the Incidence of Schizophrenia in Primitive Society," op. cit.

[21] Devereux, op. cit., p. 317, states, ". . . . the tribes in question are at present in the throes of a rather brusquely imposed acculturation process which . . . . may account for the occurrence of schizophrenia in the area." See also R. C. Thurnwald, Black and White in East Africa, London, 1935.

[22] W. S. J. Shaw, "Some Observations on the Etiology of Dementia Præcox," Journal of Mental Science, 16: 505-511, 1930.

[23] J. Dhunjiboy, "A Brief Résumé of the Types of Insanity Commonly Met with in India. . . . ." Journal of Mental Science, 16: 254-264, 1930.

[24] C. Lopez, "Ethnographische Betrachtungen über Schizophrenie, " op. cit.

[25] Emil Kraepelin, Dementia Præcox and Paraphrenia, Edinburgh, 1919, p. 231 (translated from the eighth German edition).

[26] Loc. cit.

[27] F. H. G. Van Loon, "Protopathic-Instinctive Phenomena in Normal and Pathological Malay Life," op. cit.; H. C. Clifford, Studies in Brown Humanity, London, 1898, pp. 189-195.

[28] Margaret Mead, Growing Up in New Guinea, New York, 1930, pp. 66-67.

[29] Margaret Mead, Coming of Age in Samoa, New York, 1928, Appendix IV.

more flexible, the concept of the mercy of God without the doctrine of original sin."[30]

## Conclusions

A survey of the literature reveals that the present state of our knowledge of the schizophrenic reaction in non-literate societies is as inadequate as our knowledge of comparative psychopathology in general. This inadequacy becomes apparent when one considers what should be known about the psychopathologies of a wide range of societies. Ideally, answers to the following questions would seem to be called for in the case of each society investigated. (1) What mental disorders are found, and how do the symptom pictures differ from, or resemble those of Euro-American society? (2) To what extent are psychopathological behaviors defined as such in terms of Euro-American values, to what extent are they defined relative to the values of the culture investigated, and to what extent do they represent deviations from universal social norms (e.g. mutism, extreme negativism, homicidal mania, etc.)?[31] (3) Which personality and temperament types enjoy the greater opportunities for expression, for drive and wish fulfillment, and in what social spheres do these opportunities exist? (4) What are the adjustment hazards figuring in the histories of individuals ultimately declared abnormal? How are they related to the social organization on the one hand, and to the biology of the individual on the other; and in what ways do they resemble or differ from the adjustment problems of the mentally ill in various Euro-American groups? (5) To what extent do the psychotic productions—language, thought and other behavior in the psychosis—reflect inter- and intra-institutional conflicts; and to what extent do they reflect conflict between social and individual expectations? (6) In what ways may the incidence of mental disorder in the society in question be said to be associated with the "advance" of material culture and civilization?

The students of schizophrenia among primitives have devoted themselves almost exclusively to the question, Where is schizophrenia found? Seligman and Faris report an absence of the disorder in societies which remain largely isolated from white influences, but one may not attach great importance to their findings inasmuch as the data are limited, and methodological assumptions and research operations are veiled and suspect. Yet, in view of the fact that wherever schizophrenia has been reported the society in question has been in process of acculturation, a sociological hypothesis involving the concepts of culture conflict, marginality and shock appears tenable.[32] Laubscher, Hummer, Dhunjiboy, Shaw, Kraepelin, Lopez, and Mead found schizophrenia among peoples who, though frequently classed as primitive—even by the investigators in some cases—are actually in the throes of acculturation. However, the rarity or absence of schizophrenia among truly primitive peoples generally has simply not been established, in spite of Devereux's overoptimistic conclusion that it has.[33] Moreover, it would seem that the definitive answers to the research questions previously formulated will come only from a body of facts that is at present almost wholly non-existent. That is to say, any satisfactory understand-

[30] Ibid., p. 273, 276-277.

[31] In spite of the relativistic principle of abnormality elaborated by Benedict (Patterns of Culture, Boston, 1934; "Culture and the Abnormal," Journal of General Psychology, 10: 59-80, 1934) and others; in support of which it is pointed out that the catatonic, paranoiac and epileptic may enjoy acceptability and perhaps occupy superior statuses in some societies, there is nonetheless a limit beyond which the individual's pathology necessitates his excommunication and isolation regardless of the culture. For example, as Stagner notes, extreme catatonia and the later stages of paresis would deprive the individual of even the barest minimum of human traits, so that it is inconceivable that he would be a genuine member of any society. (Ross Stagner, op. cit., p. 418.) It is not unlikely that case studies of the mentally ill in our own society would indicate a rather frequent awareness of the limits to which the person may indulge his abnormality without losing the social acceptance he desires, as well as an awareness of the ways in which abnormal expression may be utilized as a means of gaining or holding a desired status.

[32] Devereux has presented a well formulated hypothesis which deserves consideration in analyzing a series of detailed schizophrenic histories from various primitive groups. G. Devereux, "A Sociological Theory of Schizophrenia," op. cit.

[33] Ibid., p. 317.

ing of comparative psychopathology, either among primitive or civilized societies, must be predicated (1) on reliable diagnoses (and derived statistics of incidence) made by psychiatrists who are willing to honestly entertain sociological hypotheses; and (2) on the interpretation of detailed life histories by psychiatrically oriented sociologists, or preferably, by psychologists and sociologists in collaboration. Unfortunately, such knowledge remains as conspicuous by its absence today as it was seven years ago when Hallowell called attention to our need of it,[34] and the task of the travelling field-worker is considerably complicated by wars and rumors of wars.

[34] A. I. Hallowell, "Culture and Mental Disorder," op. cit.

# THE "PETIT MAL" RESPONSE IN ELECTRIC SHOCK THERAPY[1]

By LOTHAR B. KALINOWSKY, M.D., S. EUGENE BARRERA, M.D., AND WILLIAM A. HORWITZ, M.D.

*New York, N. Y.*

In electric shock treatment two essentially different reactions are obtained, the grand mal convulsion and the so-called petit mal response. Both of these reactions resemble the corresponding phenomena of epilepsy. The object of this study was to determine whether the therapeutic effect of the petit mal treatment was comparable to that achieved with the grand mal reaction. If this were so, we then would have a much less drastic method of treatment without the limitations of a major convulsion. It is generally admitted that the muscular discharge of itself is not the effective agent in convulsive therapy. Therefore it still remained to be determined whether another factor common to all epileptiform manifestations, namely the loss of consciousness, was or was not the unknown therapeutic factor in shock treatment. Unconsciousness, absent in metrazol treatment without convulsions, is practically always present in non-convulsive electric shock therapy. Therefore it might have been expected that this response to the electric stimulus was sufficient for our therapeutic purposes.

In elaborating the symptomatology of the non-convulsive response in electric shock therapy we have to describe the different stages encountered from a short period of simple unconsciousness to a fully developed convulsive seizure. Our technique of electric shock therapy is the usual one of applying a given voltage of alternating current for a tenth of a second. If small amounts of not more than 15 volts are given, we simply obtain a painful sensation without loss of consciousness. Such amounts are used in Berkwitz's so-called "faradic shock treatment"(1), which therefore cannot be considered based on the same principle as electric shock therapy in the sense of Cerletti and Bini(2). If we increase the voltage to 40 or 50 we obtain a response called by the originators of the method "missed shock." This reaction consists of violent vertigo, nausea and vasomotor phenomena, such as pallor, perspiration and eventually a faint-like state, but still consciousness is not lost. These symptoms might be due to vestibular stimulation, but it is difficult to explain why these phenomena are not met with as soon as we obtain unconsciousness of even the shortest duration. This response can and should be avoided by giving sufficient current of at least 60 volts which will always produce a state of unconsciousness, the so-called petit mal response.

The average patient receiving 60 volts may show only a very short period of unconsciousness lasting a few seconds. Five volts more may produce 30 or more seconds of unconsciousness and a retrograde amnesia. A further increase in the voltage will probably lead to a still longer petit mal, with some twitchings of the facial musculature, or even a tonic innervation of these and other skeletal muscles. We may get the impression that a seizure is impending, which however does not develop. Increasing the voltage still further a generalized seizure will follow the period of unconsciousness. In this event the unconscious state is no longer termed petit mal, but rather the latent period of the grand mal convulsion. Further increases of voltage beyond the convulsive threshold result in so short a latent period that practically we can speak of the reaction as an immediate fit.

In the short petit mal the pupils react to light. In deep and long petit mals they become dilated and rigid. If a fit develops we can predict it with some probability by this dilatation and rigidity of the pupils. We may also observe vasoconstriction of the retinal vessels, which Milch(3) was able to see in a number of our patients at the end of the latent period two or three seconds before a convulsive seizure developed. In a deep petit mal a Babinski sign may be present, but

[1] Read at the ninety-seventh annual meeting of The American Psychiatric Association, Richmond, Virginia, May 5-9, 1941.

more frequently all that one observes is the absence of the plantar reflex or fanning of the toes.

During the petit mal state the majority of patients are quiet and in a sleep-like condition. Others will show phenomena which resemble the pre-convulsive automatisms of epileptics. One of our patients started undressing during the petit mal. Others utter quick and unintelligible words, or even scream. Not infrequently we observe rolling of the eyes. The same patient usually repeats the same pattern in subsequent petit mal reactions.

We might mention here briefly a few other findings in this reaction. A fall in blood pressure—often after a slight initial rise—is seen in almost all instances differing only in quantity from that seen in the electrically produced grand mal convulsions. The blood sugar rises after the petit mal, though to a lesser degree than after a convulsion (about 12 per cent on the average). The maximum rise occurs about one-half hour after the stimulus. The cholesterol content of the blood shows an immediate drop in about 50 per cent of cases immediately after the stimulus, whereas after a grand mal seizure there is an immediate rise. After the immediate rise or fall of the cholesterol there is a return to the normal level in about an hour. These alterations in the components of the blood will be elaborated on at a later date.

We conclude from the clinical observations that the petit mal response in shock therapy closely resembles the petit mal attack of epilepsy. This is supported by the experience of one of us (L. B. K.) who was able to treat an epileptic patient showing frequent spontaneous petit mals with strange left-sided rotatory movements like coffee grinding. He showed exactly the same movements in electrically induced petit mals. If electrically induced petit mals closely approximate those seen in epileptic patients, it is obvious that this feature may have some bearings for further research problems in epilepsy.

In order to determine the therapeutic effect of the petit mal response, we treated a group of patients with petit mals exclusively. This therapy was later followed by a course of grand mal treatments in nearly all of these patients in order to contrast the results obtained by these methods. We induced petit mals as deep and of as long duration as possible. It was sometimes difficult to increase the current exactly to the point where one obtained a long petit mal but not a convulsion. Cases where the current was raised too much and a convulsion resulted were excluded from this report.

We judge the duration of a petit mal response mainly by the length of the apnea. An apnea of more than 30 seconds characterizes a long petit mal not far from the convulsive threshold. Another guide in judging the depth of the petit mal is the length of the retrograde amnesia. When a patient shows a retrograde amnesia for the entire morning and for some time after the petit mal does not remember important facts about his life, we are near the convulsive threshold. We do not increase the voltage in the next treatment if we wish to avoid a generalized seizure. However, we would note here that there is a rise in the threshold level for petit mals, though to a lesser degree, just as there is with the grand mal (Kalinowsky and Kennedy(4)). Thus we have to increase the voltage slightly during the course of treatment if we wish to obtain equally long petit mals.

Immediately after the petit mal reaction certain striking, though transient, changes in the symptom picture may occur. A catatonic stupor will clear up frequently for five or ten minutes. The patient may become alert and speak, but then return to his former condition. Any kind of inhibition may be influenced by each petit mal for a short period. This temporary reaction is similar to that seen after intravenous sodium amytal (Harris, Horwitz and Milch(5)) but does not seem to have much bearing on the final therapeutic outcome.

Actual therapeutic results in patients who had a course of 10 to 20 petit mal treatments can be reported in 27 cases. Of these 12 belonged to the dementia præcox group, 4 to the manic-depressive group, 3 were arteriosclerotic depressions, 4 belonged to the involutional group and 4 were psychoneurotics. The therapeutic effect of the petit mal treatment in this group of 27 patients was unsatis-

factory. Only 5 showed any response from petit mal treatment alone. Two of the cases of dementia præcox and one manic-depressive, depressed, showed considerable improvement. One arteriosclerotic depression and one psychoneurotic were slightly improved. Twenty-two of the 27 patients remained entirely unimproved. None of the group was considered recovered.

In order to compare these results with that which might have been obtained with treatment by grand mals, 22 of these 27 patients were then treated with a course of full convulsive seizures after they had finished the course of only petit mals. In the dementia præcox group of 11 patients 2 then went on to recovery. One of these had shown only slight improvement, the other no improvement whatsoever from the previous petit mal treatment. Of the remaining schizophrenics 5 showed only moderate improvement when the shift to grand mal treatment was made. Some of these cases of dementia præcox later did not sustain their improvement. The 3 manic-depressives who had not improved with petit mals showed definite improvement after one or two grand mal treatments. One patient with an arteriosclerotic depression, who had had 20 petit mals with no improvement, recovered after only one unintended convulsion. The 3 involutional depressions who had not previously shown any improvement, showed considerable improvement or recovery shortly after grand mal treatment was begun. The fourth, an involutional with considerable paranoid content, remained unimproved. Psychoneurotics were uninfluenced by the grand mal treatments, as they were by the petit mals. The table below shows the outcome of treatment.

CASES TREATED WITH ONLY PETIT MALS

| | No. of cases | Recovered | Much improved | Improved | Unimproved |
|---|---|---|---|---|---|
| Dementia præcox .... | 12 | 0 | 2 | 0 | 10 |
| Manic-depressive ..... | 4 | 0 | 1 | 0 | 3 |
| Involutional depression. | 4 | 0 | 0 | 0 | 4 |
| Arteriosclerotic depression ..... | 3 | 0 | 0 | 1 | 2 |
| Psychoneurosis ..... | 4 | 0 | 0 | 1 | 3 |
| Total ..... | 27 | 0 | 3 | 2 | 22 |

SAME CASES RECEIVING ADDITIONAL COURSE OF GRAND MALS

| | No. of cases | Recovered | Much improved | Improved | Unimproved |
|---|---|---|---|---|---|
| Dementia præcox .... | 11 | 2 | 2 | 5 | 2 |
| Manic-depressive ..... | 3 | 2 | 1 | 0 | 0 |
| Involutional depression. | 4 | 2 | 1 | 0 | 1 |
| Arteriosclerotic depression ..... | 1 | 1 | 0 | 0 | 0 |
| Psychoneurosis ..... | 3 | 0 | 0 | 0 | 3 |
| Total ..... | 22 | 7 | 4 | 5 | 6 |

The table shows that in 27 patients treated by petit mals alone there were no recoveries and only 3 showed considerable improvement. In 22 of these patients treated later with grand mals, 7 recovered and 4 showed considerable improvement.

We might mention that in addition to the case material mentioned here, we have had an opportunity to observe the effects of petit mals in a large number of cases not treated exclusively with this response. At the beginning of our experience we were reluctant to increase the current sufficiently. As a result we had numerous petit mal reactions during a course of electric convulsive treatment. The impression obtained during these experiences was in full accord with the results obtained here that the therapeutic effect of the petit mal treatments was not comparable to that following convulsions.

It is our impression that although the petit mal therapy in itself does not yield satisfactory results, it is not without some slight beneficial effect. This impression was enhanced when the shift to grand mal therapy was made because improvement seemed to follow more rapidly than could have been expected if there had been no previous petit mal treatment. Thus in patients of the manic-depressive and involutional group considerable improvement was seen with only one or two grand mals, whereas without any previous treatment it usually takes 4, 5 or 6 grand mal treatments to bring about the same improvement.

In order to increase the therapeutic effect we have also tried to induce two successive petit mals, one following the other before the patient regains consciousness. Mueller (6) has described this method. We have seen better instantaneous results of short

duration in this way, especially in catatonic stupor, but no influence on the final outcome. Attempts to intensify the number and length of petit mal treatments are planned.

The definite therapeutic superiority of convulsions over petit mal seizures has to be emphasized. The extensive use of electric shock therapy as an ambulatory treatment increases a tendency toward the use of petit mals. When a petit mal reaction occurs, a repetition with higher voltage usual in hospital practice, might be omitted in ambulatory treatment. We have the impression that outside of hospitals petit mals are given widely instead of the necessary convulsions. We have seen several patients unsatisfactorily treated with electric shock on an ambulatory basis who came to a full remission after the first convulsion in the hospital. This is probably due to the fact that petit mals are preferred in office practice so as to diminish the presumed risk of full treatment. In this light our results may be of some importance in explaining failures and in preventing long experimentation with non-convulsive electric shock therapy.

Our results may have some bearing on the question of the effective agent in our modern shock treatments, although they do not give an answer. Why is the convulsion necessary in order to obtain good results in electric shock therapy? The muscular discharge itself cannot be of importance. Neither is it the electric current because the voltage given in petit mal cases frequently is higher than in cases with low convulsive thresholds receiving convulsions. Apparently the patho-physiological occurrences in the brain during the convulsion are important. Since vasoconstriction, followed by vasodilatation in the retinal vessels is probably an expression of the same mechanism in the cerebral vessels, we are inclined to view the treatment effect in connection with these vascular changes and their consequences within the brain. The changes produced in this way might be insufficient in the petit mal. It may be mentioned in this connection that long-lasting electroencephalographic changes were found in a number of our patients after a prolonged course of grand mals, but not after petit mals (Pacella, Barrera, Kalinowsky(7)). While after long continued treatment with grand mals slow potentials in some cases persisted for weeks or months, those patients treated with petit mals did not show continuous slow potentials. After a single petit mal slow waves are seen for 5-15 minutes compared with about $\frac{1}{2}$-$\frac{3}{4}$ of an hour after a grand mal.

We do not deny that an attempt at petit mal treatment as a less vigorous form of electric shock might have occasional indications, *e.g.,* in old patients, cardiac hypertensitives and other conditions where we definitely wish to avoid the impact of a generalized seizure. It is also useful if we wish to keep at a minimum the number of convulsions in a given course of therapy. Here a series of petit mals seems to prepare the ground and enables us to obtain a result with only one or two convulsions which in the ordinary electric shock treatment is usually obtained only after several convulsions. It might be worth while to try petit mal treatment in the future with a different and more intensive procedure. For the present the therapeutic results with petit mals are so far inferior to those obtained with the usual electric convulsive treatment that its use should be discouraged if one wishes to obtain full benefits from electric shock therapy.

## BIBLIOGRAPHY

1. Berkwitz, N.: Faradic shock in treatment of functional mental disorders. Arch. Neur. and Psychiat., **44**: 760, 1940.

2. Cerletti, U., e Bini, L.: L'Elettroshock, Arch. Gener. Neurol., Psichiatr. e Psichoanalisi, **19**: 3, 1938.

3. Milch, E. C.: Changes in retinal arteries before convulsions induced by electric shock. Arch. Neur. and Psychiat., **45**: 848, 1941.

4. Kalinowsky, L., and Kennedy, J.: Theories of epilepsy in the light of electric shock therapy. Transactions of the Am. Neurol. Assn. 67th meeting, 1941 (page 194).

5. Harris, W., Horwitz, W. A., and Milch, E.: Regarding sodium amytal as a prognostic aid. Am. J. Psychiat., **96**: 327, 1939.

6. Mueller, M.: Elektrische Shockbehandlung in Psychiatrie. Schweiz. Med. Wchschr., **70**: 323, 1940.

7. Pacella, B. L., Barrera, S. E., and Kalinowsky, L. B.: Variations in the electroencephalogram associated with electric shock therapy. Arch. Neurol. and Psychiat. In press.

# STUDIES IN SENILE AND ARTERIOSCLEROTIC PSYCHOSES

## I. Relative Significance of Extrinsic Factors in Their Development[1]

By HAROLD W. WILLIAMS, M. D., ERNEST QUESNEL, M. D., VERA WINSTON FISH, M. D., and LOUIS GOODMAN, M. D.

*State Hospital for Mental Diseases, Howard, Rhode Island*

The number of persons over 65 years of age in the population of the United States has shown an increase of 35 per cent in the decade between 1930 and 1940(1). This increase has been reflected in the admission statistics of hospitals for the care of the mentally ill. An old problem that previously provoked little sustained interest has as a consequence suddenly become paramount.

So pressing is the problem that the character of mental hospitals is in danger of again reverting to a functional level of custodial care. Hutchings(2) states: "Our institutions promise to become in time vast infirmaries with relatively small departments for younger patients and curable disorders." He considers the standards of mental hospitals will be impaired as a result. The staff of the Rhode Island State Hospital has leaned toward this point of view and has felt effort should be expended to prevent the aged from needing mental hospital care. For these reasons a study of the mental illnesses encountered in the aged has been instituted.

The staff first set about scrutinizing the historical material. We are today reporting on the results of a comparative study of the histories of 47 individuals diagnosed as suffering from senile psychosis, and 47 individuals diagnosed as suffering from psychosis with cerebral arteriosclerosis. We wish to stress only certain less well established aspects of our findings. These aspects have been formulated by other authors.

### Literature

Rothchild(3), for example, after a comprehensive pathological study of senile psychosis writes: "Senile patients should be studied, not merely as anatomic specimens, but as living persons who are growing old and who are struggling to adjust to personal problems. The inability to meet such problems successfully may be the clinical factor that destroys or greatly impairs the person's compensatory capacity, upsetting an equilibrium which had hitherto been maintained and thereby leading to the development of a senile psychosis." Rothchild reminds us that the brain, in conformity with other organs of the body, has a potential source of reserve power. He then offers evidence that factors other than anatomical changes contribute to the development of senile psychosis.

Guthrie(4) offers evidence that the reverse is true for that other important psychosis of the aged, namely, psychosis with cerebral arteriosclerosis. He studied a large series of cases confirmed diagnostically by post-mortem examinations and concluded that psychosis with cerebral arteriosclerosis is much more an anatomical than a clinical disease. Personal factors are, he feels, reduced to a minimum and the syndrome appears to be dependent largely upon impersonal structural disease.

As determined from a historical survey, our studies indicate that these above stated differences relating to the development of senile psychoses and psychoses with cerebral arteriosclerosis do in fact exist.

### Methods of Procedure

Our methods of procedure were as follows: The error of individual judgment and opinion inherent in such a study should be minimized as much as possible by bringing into play the judgment of several individuals. Only cases where diagnostic opinion was unanimous were included.

For the pathological confirmation of the diagnosis of psychosis with cerebral arteriosclerosis, the following conditions were laid

[1] Read at the ninety-seventh annual meeting of The American Phychiatric Association, Richmond, Virginia, May 5-9, 1941.

down: That arteriosclerosis be present to such a degree in the basilar vessels grossly, and in other vessels microscopically so as to impair appreciably the lumen; that there be evidence of focal destruction of tissue, such as softenings or hemorrhages, grossly and microscopically; or that microscopically there be swath-like cortical scars or foci of "dropping out" of nerve cells in a circumscribed area, preferably with demonstrable gliosis; finally, that there be no evidence pointing to a diffuse extensive atrophy of the brain.

For the confirmation of the diagnosis of senile psychosis, we considered that there should be evidence of a diffuse atrophy of the brain as determined from the gross weight and appearance and from the microscopic picture; by diffuse loss of nerve cells; by the presence of senile plaques and Alzheimer cell changes; by abundance of lipoidal pigment within the neurons; by absence of focal lesions; by minimal or relative absence of appreciable impairment of the lumens of blood vessels; by evidences of the old age process elsewhere in the body.

In the 25 cases of psychosis with cerebral arteriosclerosis who are still living and whose diagnosis rested on clinical findings, we required evidence of focal brain damage, fluctuation in the sensorium, islands of relatively intact memory or associations, lability and irritability of mood, hypertension, peripheral or retinal arteriosclerosis, absence of positive serological reactions; while in the 35 cases of senile psychosis who are still living we required evidences of diffuse memory loss, more especially recent and progressive in character, defective judgment, capacity for concealing memory deficit, good preservation of the social amenities, and absence of focal signs or symptoms.

Cases in which the diagnosis rested on clinical findings alone, were accepted for study only if the diagnosis was definite and not merely probable. The majority of cases used in the study had been admitted to the hospital or had died in the hospital within the past four years.

Two terms need definition as here utilized. "Financial security" was said to be present if the income or resources at the time of onset did not represent a gross disproportion to the individual's estimated income for the past decade, or if the individual was being supported by another and expressed no overt dissatisfaction with such dependence.

Mr. D., who previously had a better than average income and was now dependent on an uncle for all his living expenses at the local Y. M. C. A. was regarded as financially insecure. Mr. R., who openly and repeatedly lamented his financial dependence on a married sister to whom he had previously been distant, was likewise so considered.

"Social integration" was regarded as present if the individual was living with the spouse or was living with children, other relatives, or families where he was permitted participation in the family group, or where it was felt that he had a sense of "belonging," or having reason to be interested in the welfare of others. The individual was regarded as not having social security if he was living alone through no choice of his own.

Thus, Mrs. S. no longer had social integration. Her husband had died 5 years previously. There were no children; no collaterals survived; and she was alone in the world. Likewise Mr. G. who had been divorced 20 years ago. Two children had remained loyal to the wife, living with her in another city. Mr. G. made his home with the daughter who remained loyal to him. She died two years before onset and he was left alone in the world.

The following implications may be mentioned. Individuals who had had social integration but were deprived of this satisfaction in advancing age would be considerably inclined to surrender to the inevitable. Under such deprivation, the elderly person would have negligible "reason for being" at the psychobiological level of integration. The survival of the spouse is considered to be basic for social integration; in general, people of similar ages tend to have, within certain limits, common attitudes which promote compatibility.

In the event of "surrender to the inevitable" the insidious inroads of anatomical changes that previously had not been too apparent, largely because of the reserve potentialities of the brain, would be made manifest. It is considered that this assump-

tion has application to the arteriosclerotic psychoses as well as the senile psychoses, although in lesser degree.

## Results

The scrutiny of the histories of cases diagnosed either on clinical or pathological evidence as senile psychosis, revealed a conspicuous trend. This trend of events preceding the onset of symptoms represents a setting in which the illness becomes more manifest. Most individuals developing senile psychosis had been deprived of social integration prior to onset. In the opinion of the group of observers 32 of 47 cases, or 68 per cent, had been deprived of social integration. Five, or 10 per cent, probably had been so deprived. But 7 of the group of 47, or 15 per cent, were considered to have had social integration. Three, or 6 per cent, were considered as probably having had social integration.

Deprivation is indicated in the following circumstances: of 37 who had married, only 3 had a spouse still living. In one instance there was a divorce at the age of 21, not followed by a second marriage, and in another instance the husband was hospitalized for a chronic illness one year before onset. Eighty-six per cent of the total married were obliged to face old age without the marital partner. In 4 instances the spouse died in the fourth decade, in 7 instances in the fifth decade, in 14 cases in the sixth decade, in 4 others in the seventh decade and in 3 instances in the eighth decade. The majority of spouses, then, had died between the fifth and sixth decades.

Ten, or 28 per cent, of this group of 47 had not married but had been integrating socially with collaterals or other distant relatives prior to the onset of illness. Mr. H., however, had lost his sister through death some 10 years prior to onset and was without immediate relatives and obliged to live alone. This situation was typical of this group.

Social integration despite deprivation of the spouse could be achieved through the children. However, 38 per cent or 14 out of 37 instances had had childless marriages. Often in those instances where there had been children some comparable situation developed as in Mr. G.'s case. His wife had died in 1920 when he was 59. His surviving daughter with whom he had been making his home died in 1938 when the patient was 75. The onset of his illness occurred a year later. It is our impression that social integration of those married people who had had children was often not available through their children or their children's families, but lack of information prevented us from achieving factual confirmation on this point.

These findings are in accord with those of Cameron's(5). He states: "It has been our experience that a very considerable number of older persons who finally break down and come to the psychiatric department have suffered seriously from a lack of social integration."

An additional handicap was financial insecurity. Only in 10 instances, or 21 per cent, was financial security adjudged to be present. In 2 more it was probably present.

Another impression of the senile group was difficult to anchor factually. There seemed to be an unusual number of critical happenings which disturbed the even tenor of their lives. Colloquially speaking, this group seemed to have one thing after another happen, to have had many "bad breaks."

The survey of the cases diagnosed as cerebral arteriosclerosis no the other hand did not disclose so commonly an unfavorable setting in which the psychosis developed. Thirty-six, or 77 per cent, of this group were considered as having had social integration, and 2 others as probably having had social integration. This is in marked contrast with the 15 per cent in the senile group.

Of the 39 who had married, there were but 11 instances, or 28 per cent, wherein the spouse had died. This contrasts with 86 per cent in the senile group.

Only 17 per cent of the arteriosclerotic group had not married. The impression was generally gained that those who were childless or who had lost their spouse had achieved a satisfactory degree of social integration. It seemed also that critical happenings in the lives of this group were not as common as in the senile group.

With respect to financial security, the arteriosclerotic group seemingly fared better than did the senile group. Thirty-two, or

68 per cent, were considered to have had financial security. Three others probably had had financial security. This proportion stands in contrast to 21 per cent in the senile group.

In conclusion, it would seem that senile psychoses tend to arise in a characteristic setting. Social integration as well as financial independence have not been achieved or have been denied to the individual when most needed.

In contrast, pyschoses with cerebral arteriosclerosis tend to strike down the individual in a way similar to other disease processes. Personality and situational factors are relatively insignificant.

As a consequence, it would seem that preventive endeavors with respect to psychoses with cerebral arteriosclerosis must await more exact understanding of the morbid anatomy and physiology of the disease processes.

On the other hand, preventive efforts with respect to senile psychoses would seem to offer some return. The extent of this return however could only be determined by a control series of cases. Such preventative effort would be directed not only toward providing financial security, but more important, toward providing opportunities for social integration. This would seem in terms of our experience, to be most readily available among others of a comparable age group, and considering the physical handicaps of the aged and the costs, the most favorable living conditions could probably be provided not in individual domiciles, but in well conducted socially acceptable institutions for the aged.

## BIBLIOGRAPHY

1. Editorial. J. A. M. A., **116**: 1526, April 1941.

2. Hutchings, Richard H.: The President's address. Am. J. Psychiat., **96**: 1, July 1939.

3. Rothschild, D.: Pathologic changes in senile psychoses and their psychobiologic significance. Am. J. Psychiat., **93**: 757, Jan. 1937.

4. Guthrie, Riley H.: Clinical symptoms and anatomical changes in psychosis with cerebral arteriosclerosis. To be published.

5. Cameron, D. Ewen: Present day trends in neuropsychiatric research. A round table discussion. Am. J. Psychiat., **97**: 780, Jan. 1941.

# GLIOMA OF THE DIENCEPHALON IN A MANIC PATIENT[1]

By KARL STERN, M.D., AND TRAVIS E. DANCEY, M.D.

*Montreal, Quebec*

The following is the report of a case which is interesting from different points of view. First, it may serve as a contribution to the problem of emotional disorders in diencephalic lesions—a problem which has lately come much into the focus of interest (compare the review by Alpers, 1940). Second, it is important from a merely technical, forensic-medical point of view as to the nature of sudden death during a psychosis.

## Clinical History

R. V., an Austrian Jewess, came to Canada in 1921 when fourteen years of age, and was evidently quite normal until ten years later. The only notable points in the family history concern the paternal grandfather, who was depressed just before he died in 1933, and one sister who had "convulsions" at the age of three but none since.

The patient became excitable and talkative about 1931, when she began to quarrel with her husband for small reason and to show her displeasure by doing such things as breaking dishes in his presence. There was a gradual increase in her lack of emotional control until June 1937 when she fled her home in Montreal and tried to enter the United States. She was stopped at the border because of her abnormal behavior and was brought to the Verdun Protestant Hospital by her husband, where she readily signed a voluntary admission form. She was then thirty years of age and was in excellent physical condition, except for a coarse lateral nystagmus in both directions, and a coarse tremor of the extended fingers and tongue. (She had received nembutal grains three and sulphonal grains ten, a few hours before the examination.) Tendon jerks were present and bilaterally equal; plantars were flexor; gait was not altered. She presented the typical picture of hypomania, exhibiting flight of ideas, psychomotor overactivity and irritability. She blamed her husband for ruining the business which she had helped to develop. There was a moderate degree of insight, in that she realized that she was different from what she had been prior to 1931. When a course of hydrotherapy produced no benefit, she was placed on prolonged sedation with sodium barbital for a period of two months. The patient became quieter when receiving large doses of this medication but at the same time developed slurring speech and drowsiness and was unsteady on her feet. These toxic signs readily disappeared when the dosage was diminished but the hypomanic symptoms immediately reappeared. After three months in hospital, although she had not improved, she requested her discharge and this was granted on September 13, 1937.

The patient carried on at home much the same as previously until November 1939 when she again asked to be admitted to the Verdun Protestant Hospital as a voluntary patient. At this time she strutted about the ward with her dress pulled well above her knees and wearing gaudy ribbons in her hair. She insisted on telling the patients and nurses all the details of her married life; she boasted of her keen business sense and criticized her husband for his stupidity. Insight was not present to the same degree as previously and there was an increase in the euphoria and the overactivity, while her judgment was more impaired. Her symptoms rapidly increased in severity until three weeks after her admission, when it was necessary to transfer her to the acute ward to prevent exhaustion. She showed all the features of acute mania and her excitement was not adequately controlled by sedatives; she received at times high dosage of luminal which was well tolerated.

By the end of December 1939, she had become slightly more amenable to nursing care but still required large doses of sedatives as well as continuous baths, packs and heat baths. She was especially noisy at night and it was necessary to give her three drams of paraldehyde as well as injections of hyoscine and apomorphine. She appeared as usual on January 10, 1940, at which time her case was presented before a group of students. On seeing the students she climbed out of bed, rushed up to them and throwing her arm about the ward physician's shoulders proclaimed that he was a wonderful doctor and that she should have married him. In a very few minutes she had given her opinion of the students with no inhibitions: one was the type of man she should have married because he wore a green tie and looked "smart"; another might be all right but he didn't look "so hot." That evening she was given the usual amount of paraldehyde and slept for a few hours but awakened and began to talk in a loud voice at 1.30 a. m. As on previous occasions, hyoscine grains 1/125 and apomorphine grains 1/30 was hypodermically administered. She slept until 5.10 a. m. when she began to awake muttering and talking in a low tone of voice as usual. One hour later the nurse observed that the patient had become quiet, could

[1] From the Verdun Protestant Hospital, Montreal, Quebec.

The authors wish to thank Dr. C. A. Porteous, Medical Superintendent of the Verdun Protestant Hospital, for his assistance, and for the permission to publish this paper.

not be aroused, and was pulseless. A physician saw her five minutes later and could find no signs of life. The possibility of suffocation was investigated thoroughly but there was no evidence whatsoever that this might have occurred. The most likely cause of death appeared to be exhaustion of mania, but many features of the state of exhaustion were absent. There was no elevation of temperature, no dehydration, and her state of nutrition was good; as stated above, there had been a slight degree of mental improvement for a number of days preceding death.

### Anatomical Findings

General pathological examination can be summarized briefly. The body presented the picture of a well-built young woman. Except for a dilatation of the left ventricle and pulmonary œdema, there was no sign of disease.

The brain weighed 1330 gms. The meninges were smooth and translucent. The vessels of the circle of Willis showed no gross lesion. The brain itself was symmetrical. On cutting the fresh brain in coronal sections, no gross lesion was seen. For microscopic examination the following blocks were taken from the right side: central cortex, visual cortex, hippocampus, and one from the anterior third of the corpus striatum, two from the diencephalon, one from the anterior level of the midbrain together with the adjoining pulvinar. From the left side the following blocks were taken: central cortex, hippocampus, diencephalon and corpus striatum. Apart from this, bilateral blocks were taken from the pons, from the level of the posterior colliculi and from the medulla oblongata. These blocks were primarily fixed in alcohol, imbedded in celloidin and stained with thionin, and hæmatoxylin-van Gieson.

*Microscopic Examination.*—Sections from the lungs, kidneys, liver, spleen, thymus, pituitary gland, suprarenals were imbedded in paraffin and stained with hæmatoxylin-eosin. They showed no abnormality except for pulmonary œdema. *Brain:* The picture of the meninges, vessels, nerve cells and glia showed no abnormality anywhere except for a lesion which occupied the posterior level of the diencephalon on the right side (Fig. 1). Under low power it stood out as a dense collection of cells, an area almost round in shape and measuring 1.3 cms in diameter. It occupied Forel's field H, the lateral fifth of the substantia nigra, part of the ventro-lateral thalamic nucleus and the structures between these two (see below). Under higher power (Fig. 2) it was found to consist of a collection of cells with elongated rather dark-staining nuclei, and protoplasmatic tails visible on either side of the nucleus. These cells were arranged irregularly, varying in density, or in more or less parallel streams. No mitotic figures were visible. The growth was rather poor in vessels; those present were rather thin walled. There was no evidence of necrosis or of hæmorrhage. The nerve cells in the zone occupied were well preserved even in the densest parts, and showed no signs of lesion. In spite of the impossibility to carry out specific metal impregnations on this primarily alcohol-fixed material the diagnosis of a *spongioblastoma polare* was made.

In *serial sections* (20 μ, each tenth section stained with thionin) it was found to occupy the area between substantia nigra, thalamus and geniculate bodies, invading the first two mentioned structures but not affecting the last mentioned one, extending from the level of the posterior third of the corpus Luysii into the pulvinar, the "prætectal area" and the outer zone of the griseum centrale of the third ventricle. These structures as well as Forel's field H and the zona incerta were invaded.

### Discussion

In discussing the clinico-anatomical correlation various possibilities have to be considered. At first glance one might be inclined to regard this as a mere coincidence of two diseases not related to one another. This is the more suggestive, as the duration of the psychosis, almost nine years, seems longer than the development of a glioma may take. However, the spongioblastoma polare is an exceedingly slowly growing neoplasm, and a premortal history of nine years is quite conceivable (Elvidge, 1941). The second possibility is a symptomatic psychosis, *i.e.*, this patient was potentially a manic-depressive one in whom any organic cerebral lesion might have provoked a psychotic picture of this type. The fact that there is an abnormal family history appears to be in favor of this theory. For the assumption of a symptomatic psychosis, the question of localization of the cerebral lesion has been generally considered unimportant.

Going over the statistics in Schuster's (1902) classical monograph on "Psychic Disturbances in Brain Tumours," one is almost inclined to explain the present case as such a symptomatic psychosis in which the actual localization of the tumor is insignificant. This author saw mania-like pictures in 1 tumor of the frontal lobe, 2 cerebellar tumors, 1 occipital tumor, 1 tumor affecting the basal ganglia and ventricles, and 4 tumors affecting the pituitary. Nevertheless, even here it is striking that the frontal lobe which plays such a prominent part in this author's statistics should be represented by only 1 case as compared to the 4 tumors affecting the base of the brain.

After studying the literature on other observations one comes to the conclusion that the relation between anatomical lesion and clinical picture is not merely hazardous. Fulton and Bailey (1929) make the explicit statement that they have seen manic attacks only in tumors in the vicinity of the base of the brain, never in neoplasms affecting the hemispheres. Foerster (1933) saw two manic reactions while handling and producing traction on the hypothalamus. One patient showed the typical picture of flight of ideas with joking, rhyming and punning. These patients had never shown any signs of psychosis before. Foerster and Gagel (1933) in describing a case of cyst of the third ventricle discussed the relation between the diencephalon and midbrain on one hand and emotional tone on the other. According to their theory there is an antagonism between the two regions—destruction in the area of the posterior level of the third ventricle and the quadrigeminal plate causing excitement and euphoria, while stimulation of that area caused apathy and somnolence. As regards the anterior part of the floor of the third ventricle exactly the reverse was true.

Guttmann and Herrmann (1932) demonstrated a case similar to the present one with two manic episodes (at 27 and at 49 years of age), with the picture of a fairly well adjusted personality in the intervals between the attacks. There was a suprasellar neoplasm invading the diencephalon. They collected from the previous literature 12 cases of circumscribed lesions with manic-depressive psychoses, or psychoses resembling endogenous types; in all these cases the lesions were localized somewhere between the stalk of the pituitary and the anterior margin of the pons. It appears that wherever manic attacks, either transient states of excitement or true psychoses were observed in association with circumscribed lesions, these lesions were with few exceptions localized in the depth of the brain stem or at the base of the brain (Schilder and Weissmann 1927, Cushing 1929, Urechia 1934, Cox 1937, Dott 1938). The survey of all these cases and those of hallucinosis described by Lhermitte (1922) and Van Bogaert (1927) shows clearly that no relation to any particular structure can be made out except for the general localization "somewhere in between the stalk of the pituitary and the anterior margin of the pons." This is also the impression conveyed by certain profound personality disorders following encephalitis lethargica (Stern 1936), and interesting emotional responses obtained by stimulation of the hypothalamus in man (Grinker 1939).

Because of these observations one can no longer deny that there is a connection between the diencephalo-mesencephalic region and personality disorders; nevertheless the question remains why many pathological changes in those regions fail to produce such disorders. It appears from the present case that in addition to the lesion and its particular localization, there must be an endogenous predisposition. Analogous observations have been made in the case of traumatic epilepsy (Lennox, 1940).

In a case like the present one it is very problematical whether the lesion, its nature and its particular localization are sufficient to explain the patient's death. Sudden death, even in the case of small gliomas is often seen after hæmorrhages. Why a comparatively slowly growing tumor which invades and encroaches upon nervous elements rather than destroying them should suddenly lead to death is hard to explain. However in the absence of any other anatomical lesions in this case one has to accept it as a cause of death even if the actual mechanism remains obscure.

One cannot discuss this case without stressing one merely technical point concerning the post-mortem examination of the central nervous system in cases of sudden unexplained death. In the present instance the examination of the internal organs gave perfectly normal results. The fresh brain on cross sectioning showed no lesion. Numerous trial blocks from cortical and subcortical areas were completely negative. The only pathological area was that containing the glioma; this tumor was of spheric form and measured little over 1 cm in diameter. It is obvious how easily it can escape attention if, as in this case, it does not show macroscopically in the fresh brain. It is quite conceivable that some of the cases of unex-

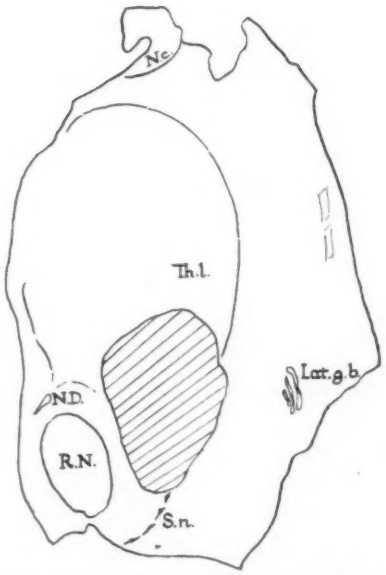


FIG. 1.—Camera lucida drawing of tumor (shaded) through approximately its middle level. N.D. = Nucleus of the posterior commissure (Darkschewitch). R.N.=Red Nucleus. S.n.=Substantia nigra. Th. 1. = Ventrolateral thalamic nucleus. N.c. = Caudate nucleus.

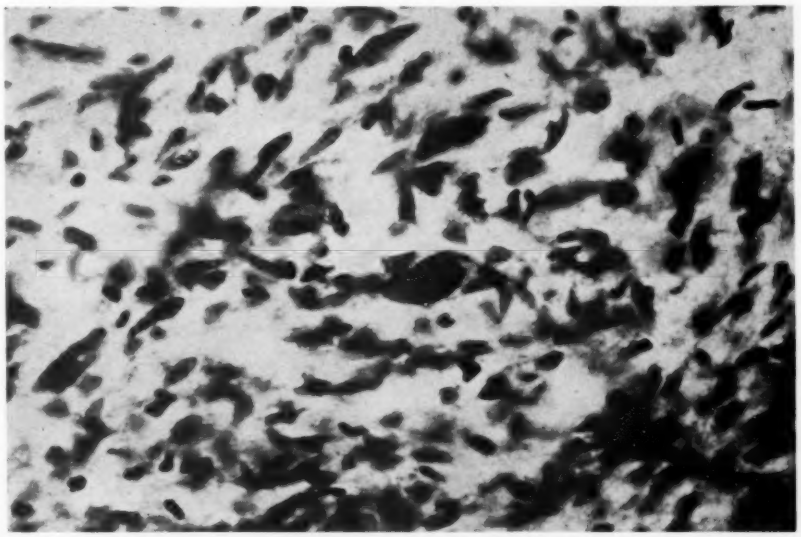

FIG. 2.—Cellular structure of tumor. The large cell in the centre is an intact ganglion cell. Note the elongated, cigar-shaped and fish-shaped nuclei of tumor cells. (Nissl.)

plained death as reported in the forensic-medical literature, especially also some of the doubtful cases of "status thymo-lymphaticus" were actually cases like the present one. It seems necessary for the study of problematic psychotic conditions to examine the brain in large blocks from the areas mentioned above, in order to facilitate the topographic survey.

## Summary

A physically healthy young woman who suffered from a prolonged attack of mania increasing in severity, died a sudden clinically unexplained death. Post-mortem examination revealed a circumscribed glioma (spongioblastoma polare) in the right diencephalo-mesencephalic area. The case is discussed in the light of similar previous observations. Certain points in the technique of the examination of the central nervous system in cases of sudden unexplained death are stressed.

## BIBLIOGRAPHY

Alpers, B. J.: Personality and emotional disorders associated with hypothalamic lesions. Psychosom. Med., **2**: 286-303, 1940.

Cox, L. B.: Tumours of the base of the brain, their relation to the pathological sleep and other changes in the conscious state. Med. J. Aust., **1**: 742-752, 1937.

Cushing, H.: The pituitary body and hypothalamus. C. C. Thomas, Springfield, 1929.

Dott, N. M.: The hypothalamus, p. 212. Oliver and Boyd. London, 1938.

Elvidge, A. R.: Personal communication, 1941.

Foerster, O., and Gagel, O.: Ein Fall von Ependymcyste des III. Ventrikels. Ein Beitrag zur Frage der Beziehungen psychischer Störungen zum Hirnstamm. Ztschr. f. d. ges. Neur. u. Psychiat., **149**: 312-344, 1933.

Grinker, Roy R.: Hypothalamic functions in psychosomatic interrelations. Psychosom. Med., **1**: 19-47, 1939.

Guttmann, E., and Herrmann, K.: Ueber psychische Störungen bei Hirnstammerkrankungen und das Automatosesyndrom. Ztschr. f. d. ges. Neur. u. Psychiat., **140**: 439-472, 1932.

Lennox, W. S., Gibbs, E. L., and Gibbs, F. A.: Inheritance of cerebral dysrhythmia and epilepsy. Arch. Neur. Psychiat., Chicago, **44**: 1155-1183, 1940.

Lhermitte, J.: Syndrome de la calotte du pédoncule cerebral: les troubles psychosensoriels dans les lésions du mesencéphale. Revue neurol., **38**: 1359, 1922.

Schilder, P., and Weissman, M.: Amente Psychose bei Hypophysengangtumor. Ztschr. f. d. ges. Neur. u. Psychiat., **110**: 767-778, 1927.

Schuster, P.: Psychische Störungen bei Hirntumoren. Stuttgart, Enke, 1902.

Stern, F.: Epidemische Encephalitis, in Bumke-Foerster's Handbuch der Neurologie. Berlin, Springer, **13**: 307-500, 1936.

Urechia, C. I.: L'examen du système hypophysotuberien dans un cas de manie aigue. Rev. neurol., **1**: 585-589, 1934.

# THE PROBLEM OF BRAIN TUMOR IN PSYCHIATRIC DIAGNOSIS

By HOWARD D. McINTYRE, M.D. and AURELIA P. McINTYRE, M.D.

*Cincinnati, Ohio*

A survey of necropsies in psychiatric hospitals discloses the presence of train tumor in 3.5(1) to 6.7(2) per cent of psychiatric cases coming to autopsy. In Larson's series the figure was as high as 13.5(3) per cent. All too frequently the tumor which has been overlooked and wrongly diagnosed as a psychosis is a benign operable meningioma, which fact makes the mistake all the more serious. This state of affairs should not be accepted with complacency. The psychiatrist has not kept pace with the neurologist and neurosurgeon as far as the diagnosis of tumor is concerned. We as psychiatrists should become more brain tumor conscious and we should acquire more skill in neurologic diagnosis.

The correct diagnosis of brain tumor still remains perhaps the most difficult diagnosis in medicine. Certainly brain tumor is overlooked and confused with other neurological syndromes more often than is any other pathological condition. If a large number of diagnosticians were asked: "What are the symptoms of brain tumor?" most of them would immediately begin by enumerating headache, vomiting and choked disc. The initiated know that when headache, vomiting and choked disc are present the tumor has attained such a size that surgical treatment will be most hazardous to the patient and trying on the neurosurgeon. The following paper deals with a number of cases of brain tumor with psychotic symptoms in which an incorrect diagnosis had been made by one or more competent psychiatrists, neurologists or neurosurgeons. In some cases these erroneous diagnoses were made in clinics of international repute. It is hoped that by a consideration of these mistaken diagnoses we may improve our diagnostic skill. In retrospect what were the reasons for these mistakes? In the order of their importance they are:

1. Lack of "brain tumor consciousness" in the mind of the examiner.

2. Disregard of the facts that a detailed chronological history and repeated detailed neurological examinations still remain the foundation stones of correct neurological diagnosis.

3. Failure to realize that headache, vomiting and choked disc are not early signs of tumor.

4. Undue reliance on the absence of increased intracranial pressure as measured by the manometer. Several of the cases in this series had cerebrospinal fluid pressures well within normal limits. One patient with a huge meningioma had cerebrospinal fluid pressure readings on three successive occasions, months apart, of 40 millimeters, 60 millimeters, and 60 millimeters of water respectively.

5. Too much weight given to the normal protein content of the cerebrospinal fluid.

6. Too much reliance on negative x-ray findings in the skull. Routine skull plates often yield extremely valuable evidence of tumor, such as erosion or ballooning of the sella, suprasellar calcification in craniopharyngiomas, increased vascular marking in meningiomas, calcium deposits in tumors, pineal shift, enlarged optic foramina, pressure defects in petrous ridges. We must not forget, however, that at least 50 per cent of skulls which harbor tumors show no x-ray evidence of their presence.

7. Failure to perform or undue delay in performing some type of air injection. In this connection we may say that although no air injection of any sort should be made without an exhaustive neurological survey and appraisal beforehand, there is a tendency for psychiatrists and neurologists to procrastinate as far as ventriculography is concerned. On the other hand the surgeon is apt to resort to air studies as a short cut to diagnosis. Somewhere between these two extremes lies perfect judgment.

When brain tumor occurs associated with psychotic symptoms we must remember that patients suffering with a major psychosis may also harbor a brain tumor. In another

group of cases we must recognize that the tumor is the cause of the psychotic symptoms. Representing the first group, I have seen and many other observers have reported the occurrence of brain tumor in the schizophrenic and paranoid psychoses as well as in the manic-depressive psychoses. It is obvious that in such cases the tumor is not the cause of the psychotic symptoms; psychotic patients are as apt to develop brain tumor as any other group of individuals. The problem of the psychiatrist is that he should not become so preoccupied with the psychotic symptoms that he fails to recognize the progressive symptoms of an intracranial lesion.

CASE I.—*Brain tumor occurring in the course of schizophrenia.*

A white woman, age 29, was seen October 3, 1936. History obtained from the family revealed that for several months the patient had exhibited stereotyped movements as well as evidence of auditory hallucinations. Past medical history is interesting from a glandular standpoint insofar as it concerned the development of future events. This patient began to menstruate at the age of fourteen. At the age of seventeen while in a nurses' training school, menstruation ceased. She was examined by an obstetrician who told her that she was pregnant. This so upset the patient that she gave up nursing training, remarking that if physicians knew no more about medical conditions than the man who told her that she was pregnant, she did not want anything further to do with the medical profession. The patient never menstruated again and was obviously not pregnant at that time. She later obtained a job as cashier in a bank. The bank was held up, the chief cashier was kidnapped, and the patient had to go through quite an ordeal in testifying in the ensuing trial. She worried about this a great deal, gave up her position in the bank and took up the study of beauty operating and became quite proficient at this occupation. She had worked as a beauty operator for about four years when her present symptoms began. It was first noted that she was quite nervous, that she had auditory hallucinations and ideas of reference. She would ask the family to turn off the radio, saying that the voices coming through the radio referred to her. She became mute, the only word she would say being the word "so" whenever she was asked a question. However, when given a pencil and paper and asked to do problems in arithmetic she did them quite well and made no mistakes. Her sister stated that on rare occasions when she would talk, it was evident that her memory for remote and recent events was not impaired.

Neurological examination—Papillæ were normal. Visual fields normal. External eye muscles normal. Remainder of the cranial nerves normal. Deep reflexes hyperactive on the two sides. There was positive Chaddock sign on the right, also bilateral Strumpell sign. Abdominal reflexes present, active and equal. The patient indulged in a peculiar stereotyped movement of the hands resembling athetotic movements. She walked with a stereotyped gait placing one foot in front of the other, dragging one foot after the extended foot and repeating this maneuver over and over again. X-rays of the skull revealed marked enlargement of the sella turcica with erosion of the posterior clinoids. The basal metabolic rate was minus 8 per cent. Patient's figure was feminine in type, breasts were well developed, arms, legs, trunk and hips were shapely, there was an excessive hair growth on the face, there was a masculine hair line on the abdomen, and the legs were excessively hairy.

This patient was given x-ray treatment over the pituitary because she refused surgical intervention. The mental symptoms were not benefited in any way and she became more resistive, more stereotyped in her activities. It was difficult for those who had taken care of her to get her to cooperate in any way. She still showed evidence of stereotyped gait, hallucinations of hearing, mutism and catatonic attitudes. After the x-ray treatment over the pituitary there was a striking change in the patient's condition. Her figure lost its shapeliness, the chin, neck, abdomen and legs became very fat and, whereas the patient had been an attractive girl before x-ray treatment, her features became coarse and more or less repulsive along with a gain in weight and loss of shapeliness of the figure. The family insisted that the patient have an operation although the visual fields had not shown any change and there was no atrophy of the optic nerve. A large pituitary adenoma was removed. However, the patient's condition has remained unchanged since the operation. In this case it is obvious that the patient was suffering with schizophrenia and that brain tumor played no part in the psychotic symptoms.

We now come to a consideration of those cases in which brain tumor was a direct cause of the psychotic symptoms but in which an incorrect diagnosis of some type of psychosis had been advanced. What were the incorrect diagnoses suggested? In the order of frequency they were:

1. Alzheimer's disease or presenile dementia.
2. Arteriosclerotic dementia.
3. Psychosis with Parkinson's disease.
4. Chronic alcoholism.
5. Toxic amblyopia caused by alcohol and tobacco with alcoholic psychosis.
6. Encephalitis.
7. Froelich's syndrome with mental deficiency.

We shall consider one illustrative case report as an example of each of these diagnoses.

CASE II.—*Brain tumor incorrectly diagnosed as Alzheimer's disease.*

A white female, age 56 years, was admitted to the Cincinnati General Hospital July 11, 1938. On admission she was negativistic to an extreme degree and the entire history of the case had to be elicited from her husband. He stated that about one year previously the patient became slovenly in her appearance, indolent and lacking in ambition, drowsy and apathetic. She could perform ordinary tasks only with the most extreme effort. Previous to this time she had been a thrifty, meticulous, German housewife. Three months before admission she complained of frontal headache, she became argumentative with her husband and when he suggested a visit to a physician she became maniacal and attempted to throttle him. Two months before admission she became confused, talked irrelevantly and incoherently. One month before admission she became stuporous, bedridden, was incontinent of stool and urine, and finally negativistic. There was some recent weight loss.

On examination the patient was seen to be moderately obese and well developed. She would not respond to questions without stimulation, then spoke with a whispered monotone answering with impertinent disparaging remarks which were irrelevant. She appeared to be drowsy, opened her eyes only when stimulated, had a mask-like facies, the head was turned to the right and most of the time there was a tremulous pill rolling motion noted in the fingers. The right pupil was 4 millimeters, the left 3 millimeters, both reacted slightly to light. Corneal opacities of the right eye obscured the disc to some extent although the ophthalmologist noted that it was pale. The left disc disclosed temporal pallor considered by the ophthalmologist to indicate optic atrophy. Cooperation was lacking for accurate testing of the visual fields or other portions of the nervous system. The patient was able to move the upper and lower extremities. Corneal reflexes were intact, all deep reflexes were present, active and equal. Abdominals could not be obtained, there was Chaddock sign on the left side and bilateral grasp reflex. Sensory examination could not be carried out because of the stuporous condition of the patient. The spinal fluid revealed a pressure of 100 millimeters of water. Later taps revealed pressure of 240 millimeters, 150 millimeters, and 90 millimeters. The fluid contained 6 lymphocytes, protein measured 60 mgm. per 100 cc. Blood and spinal fluid Wassermann negative. Gold curve negative.

A diagnosis of Alzheimer's disease was made by the visiting staff although one member of the resident staff insisted that this patient had a basal frontal lobe tumor, basing his opinion on the belief that she had a partial Foster Kennedy syndrome with bilateral pallor of the disc. The patient developed pneumonia and died twenty-four days after entering the hospital. Necropsy revealed a large meningioma in the anterior cerebral fossa with localized cerebral atrophy and chronic leptomeningitis. (See Fig. 1.)

CASE III.—*Brain tumor incorrectly diagnosed as arteriosclerotic dementia.*

A white male, age 66, was seen April 6, 1938. It had been noted by the family that the patient had been deteriorating mentally during the preceding three months. He had shown failing memory for recent events although remote memory was fairly well maintained. It was also noted that the patient was euphoric and unduly facetious, and on occasions he had shown abnormal irritability, losing his temper in minor situations which ordinarily would not have caused him to be irritable. He had become careless of his personal appearance and slovenly in his eating habits, on many occasions spilling food on his person. He had shown incontinence of bladder and on two occasions incontinence of feces. Difficulty in walking had developed, the patient walking with an ataxic spastic gait.

History disclosed that five years before the patient was working with his automobile when a tire tool struck him on the right side of the head. He recovered from this accident and did fairly well except for failure of vision in the right eye. Following the accident there was ptosis of the right eyelid. He lost the sight of the right eye due to glaucoma. There was no diplopia preceding the blindness in the right eye. In March 1938, the patient had complained of pain over the right parietal region. He stated that he was conscious of a desire to urinate but was unable to control the bladder. There had been no tinnitus. Sense of taste and smell were normal. No vertigo. No hallucinations of taste or smell. Patient was able to swallow normally. There was no weakness or ataxia of the arms or legs for the past three months. His gait in March 1938 resembled the gait of a patient with cerebellar tumor, the patient staggering like a drunken man.

Neurological examination on April 6, 1938 revealed that the left papilla was normal, the left pupil reacted to light. The right eye had been removed. There was ptosis of the right eyelid. Muscular movements of the left eye were normal. Corneal sensation normal in the left eye. Fifth nerve normal, both sensory and motor divisions. Weakness of the left lower face, upper motor neuron in character. The palate and pharyngeal reflexes were normal, likewise the palatal and pharyngeal movements. Tongue protruded in the midline. Biceps, triceps and radials were present and active on both sides, more so on the right. Knee and Achilles were hyperactive, more so on the right. Abdominal and cremasteric reflexes were not obtained. There was bilateral Chaddock sign, also bilateral Oppenheim sign. Gordon sign was present on the right, absent on the left. Strumpell sign was positive on the right. Grasp reflex was present bilaterally, being more marked on the right. Sensation was normal for light touch, stereognosis, temperature and vibratory sense. There was past pointing to the left with the left hand in the vertical past pointing test. Adiadokokenesia of the left hand was present. The right hand was held in an athetotic spastic position. Patient did not swing the right arm in walking. There was marked ataxia of the trunk. The patient

FIG. 2.—Brain tumor incorrectly diagnosed as tobacco and alcohol amblyopia with psychosis. Here again this mistake would not have occurred had Foster Kennedy's syndrome been correctly evaluated.




FIG. 1.—Brain tumor incorrectly diagnosed as Alzheimer's disease. This mistake would not have occurred if Foster Kennedy's ophthalmologic syndrome diagnostic of basal frontal lobe tumor had been correctly evaluated.

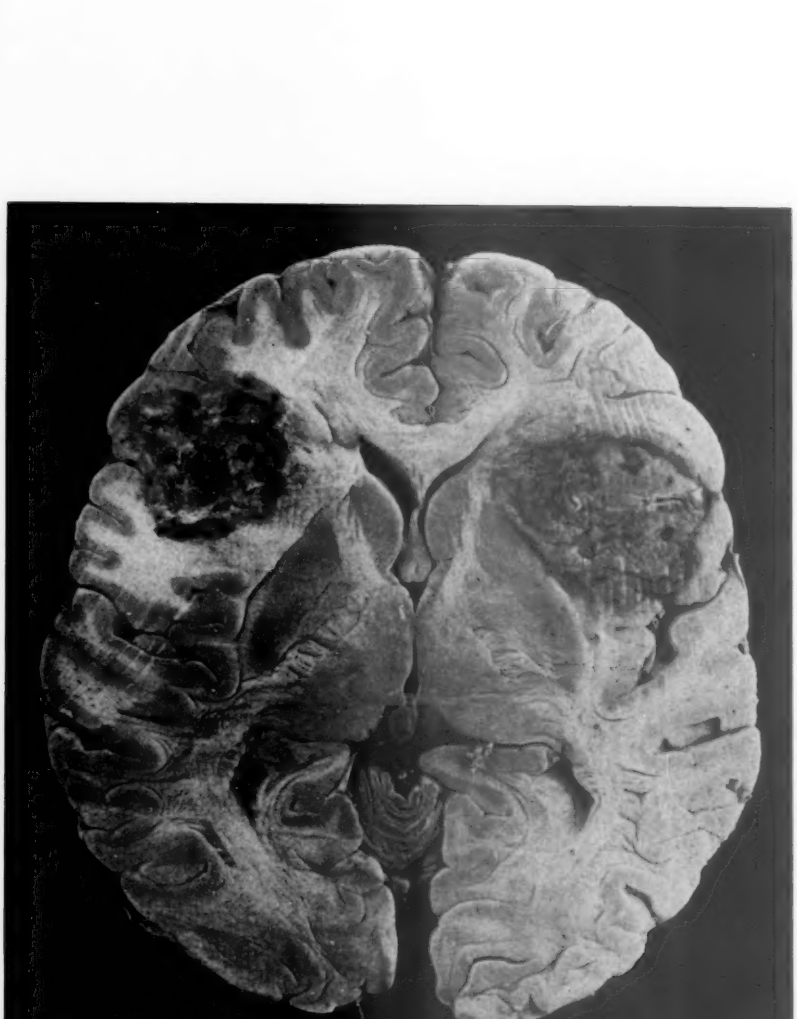

FIG. 3.—Brain tumor incorrectly diagnosed as encephalitis. Even though tumor was suspected and air injection performed, the pressure of two tumors opposite one another did not allow displacement of the ventricular butterfly, resulting in a misinterpretation of the ventriculo encephalogram.

was unable to sit in bed unassisted. The heel to knee and heel to shin test was carried out fairly well when the patient was lying down. Romberg was markedly positive. Patient walked with a wide base gait.

Spinal puncture was performed. Spinal fluid pressure registered 130 millimeters of water. Spinal fluid protein was increased, registering 70 mgm. per 100 cc. Spinal fluid Wassermann was negative. The fluid contained no cells, showed a negative gold curve.

A diagnosis of arteriosclerotic dementia had been made before I saw him. However, our diagnosis was bilateral frontal lobe lesion. An air injection was decided upon. Air injection was performed by Dr. Joseph Evans. The x-ray plates then disclosed marked flattening of both anterior horns. Exploratory operation revealed a meningioma in both frontal lobes which was removed in two stages. The patient made an excellent recovery. Bladder and rectal incontinence disappeared, his mentality returned to normal, and the patient was able to manage his farm and do all of the manual labor about the farm that he had done for years past. This improvement has continued for two years.

CASE IV.—*Brain tumor incorrectly diagnosed as psychosis with Parkinson's disease.*

A white female, age 57, was seen May 18, 1935. The patient was mentally deteriorated to such an extent that she was unable to give any history of her condition. The family stated that the patient had been in good health until two years before. Her memory then became greatly impaired and since that time she has undergone a progressive dementia. Two years ago the family had noted a shaking of the right hand which was soon followed by shaking of the left hand. She also complained of dizziness and nervousness. The family began to note a gradual failure of memory. She would forget that she had given orders in the store where she was employed and would repeat the orders. She would also forget details about the business which, when she was well, she had no difficulty in remembering. However, she continued to work after a fashion in the store until about January 1935, at which time she developed difficulty in walking, exhibited retropulsion of gait with a tendency to fall backward. The family described three convulsions which the patient had had about seven years before 1935. However, they were not very accurate as to the details of the symptoms during the convulsion.

Neurological examination disclosed bilateral choked disc with hemorrhages around the optic nerve. Pupils were normal. Patient had a paresis of lateral gaze to the left, was unable to direct gaze past the midline on looking upward. Downward gaze was carried out normally. Other cranial nerves could not be examined because of the inability of the patient to cooperate. However, it was noted that the gag reflexes were absent. Deep reflexes were hyperactive on both sides, more so on the left. The legs and arms were spastic, the right side more so than the left. There was positive Gordon sign on the left. Abdominals were absent on the two sides. There was tremor of the hand resembling a Parkinsonian tremor although the hands were held in a flexed fist position and not in the typical pill rolling position. There was bilateral grasp reflex.

Spinal fluid pressure registered 350 millimeters of water. Dynamics were normal. Fluid showed a negative Wassermann, no cells, and a negative gold curve. However, the protein was increased, measuring 140 mgm. per cubic millimeter. There was a nodding tremor of the head; also atrophy of the small muscles of the hands especially on the left side. It was deemed advisable to do a ventriculogram. A burr opening was made over the left side of the skull posteriorly and a meningioma was encountered. A large flap was turned down and the tumor was fully exposed. It was lying in the occipital region and was seen to be of large extent. There was also another large tumor anterior to this tumor in the parietal region. The patient's condition became too grave to continue with the operation and the flap was closed. Patient died five days later with hyperpyrexia. Autopsy was refused.

CASE V.—*Brain tumor incorrectly diagnosed as chronic alcoholism.*

The patient, a 50-year-old white male, was sent into the Good Samaritan Hospital September 28, 1939 with the chief complaint of weakness and numbness of the extremities for the past five months. Three years before, shortly after the death of his wife, he became despondent and began drinking a pint to a pint and a half of whiskey a day. In May 1938, he developed numbness and tingling in the extremities, particularly marked in the feet. He also noted some impairment of vision, loss of appetite and weight. Shortly before admission to the hospital all extremities became involved, patient had difficulty in walking, so much so that he lost his balance and fell. There was inability to write and also urinary incontinence. A diagnosis of chronic alcoholism had been made and I was asked to do a routine neurological examination prior to sending this patient to Longview Hospital.

Neurological examination disclosed that the papillæ were normal. Pupils equal, reacted somewhat sluggishly to light and accommodation. There was nystagmus on extreme lateral gaze both to the right and left, more marked when the patient looked to the right. Although the patient was mentally confused I thought that I could make out a left homonymous hemianopsia. Corneal reflexes were diminished on the two sides. Sensory and motor fifth nerves were normal. There was slight facial weakness on the right side. Palatal and pharyngeal reflexes and movements were normal. Tongue protruded in the midline. Deep reflexes were hyperactive on the two sides. Abdominals and cremasteric were not obtained. There was positive Babinski, Chaddock and Oppenheim on the left, and Babinski on the right. There was marked weakness in motor power in all extremities, slightly more marked on the left side. Sensation was apparently intact as far as could be determined in the somewhat stuporous condition of the patient. Finger to nose test and heel to knee test were poorly carried out. There was a terminal action tremor observed in the hands.

Spinal puncture was performed. Cerebrospinal fluid pressure registered 210 millimeters of water. Dynamics were normal. Fluid was clear, contained no cells, the Wassermann was negative, and the gold curve was negative. However, the protein was somewhat increased measuring 70 mgm. per 100 cc.

Right and left lateral stereoscopic views of the skull revealed almost complete destruction of the posterior clinoids and some erosion of the anterior clinoids. The lambdoid sutures were wider than normal. Frontal view of the skull revealed a shift of the pineal body toward the left.

The patient was referred to surgery for ventriculogram. The left ventricle could not be reached. Burr opening on the right side and cutting of the dura exposed a meningioma. The incision was enlarged and enough bone was removed to expose the tumor wall. A large 300 gram meningioma measuring 4 x 8 centimeters was removed. The patient made an uneventful recovery, was up and about in two weeks, and was dismissed from the hospital three weeks following operation. Since that time he has evinced no craving for alcohol, has gained 40 pounds, has returned to his job as a mechanical foreman at which he earns about $200 a month. He had not worked for two years prior to his operation.

CASE VI.—*Brain tumor incorrectly diagnosed as psychosis with toxic amblyopia as a result of the excessive use of alcohol and tobacco.*

A white male, age 48, was seen May 15, 1932. The mental symptoms consisted of failing memory, grandiosity resembling the grandiosity of paresis, together with a tendency to *witzelsucht*, perhaps better expressed by Foster Kennedy's term, "inept facetiousness."

Neurological examination was negative except that there was bilateral pallor of the disc with a bilateral central scotoma. Patient was suspected of having a brain tumor as a cause of the euphoria and inept facetiousness, together with mental deterioration.

A left frontal approach was made but no tumor was found. The patient reacted badly to the operation and died within forty-eight hours after operation. Autopsy revealed an ependymoma lying on the optic chiasm probably originating from the third ventricle. (See Fig. 2.)

CASE VII.—*Brain tumor incorrectly diagnosed as encephalitis.*

A white female, 51 years old, was seen March 24, 1933. History obtained from the daughter-in-law revealed that the patient had always been of a "nervous temperament," being somewhat irritable, restless and easily agitated. The family stated that she had been somewhat more restless and agitated during the last year, did not want to be left alone at home. About the middle of February 1933, she complained somewhat of headache. Two weeks later she had an attack of vomiting. One week before admission to the hospital, about March 15, patient became confused, was not oriented for time or place. Visual hallucinations developed at that time. She thought she was out on a farm and would describe the beautiful green fields that she saw. She also hallucinated a scene in which she described her son standing in a field feeding chickens. Her confusion would be punctuated by intervals of lucidity that might last as long as three hours. One month before admission to the hospital she evidenced considerable somnolence, would go to sleep on any occasion even though a visitor happened to be in the room. Two weeks before admission she had several episodes of bladder incontinence. The somnolence became worse and she would go to sleep at the table while eating. However, her appetite continued to be good throughout her illness.

My neurological examination on March 24, 1933 revealed the following: Bilateral choked disc. Pupils were equal, reacted well to light and accommodation. There was slight weakness of the left lower face, otherwise the cranial nerves were normal. Deep reflexes were hyperactive on the right side. Abdominals were diminished on the right side. The patient now presented incontinence of both bowel and bladder.

Spinal fluid pressure registered 300 millimeters of water. Spinal fluid Wassermann was negative, fluid contained 5 lymphocytes per cubic millimeter, protein registered 80 milligrams per 100 cc., gold curve was negative.

The usual stereoscopic views of the skull showed nothing abnormal.

Spinal encephalogram was done. The outline of the ventricles appeared to be normal. The butterfly was in the midline. However, it was noted that the right ventricle was somewhat higher in position than the left. This defect in filling was noted, was considered to be a technical error and was not properly interpreted at this time. The patient continued to be somnolent during the next month. At times she could be roused, at other times she could not be roused. She ate well, did not have vomiting, did not complain of headache.

Spinal puncture was again performed on April 25, 1933. Spinal fluid pressure was somewhat lowered, registering 250 millimeters of water. Spinal fluid Wassermann was negative, fluid now contained 10 lymphocytes, globulin still registered 80 mgm. per 100 cc. Gold curve now showed a slight precipitation in the upper tubes of the series which was interpreted as an evidence of a meningo-encephalitis. Patient continued to be somnolent although she could be roused on occasion, was somewhat more confused when roused. She died May 1, 1933. Autopsy disclosed the presence of bilateral tumors about the size of a lime. These were almost symmetrically placed in both frontal lobes. The autopsy disclosed the reason for the filling defect in the ventricles and also the reason for the butterfly being in the midline. The tumors being about symmetrically placed did not allow a shift of the ventricular system to either side. (See Fig. 3.)

CASE VIII.—*Tumor of the optic curve and chiasm incorrectly diagnosed as Froelich's syndrome with mental deficiency.*

A white male, age 16, presented himself for examination in June 1930, had been treated in a behavior clinic. Neurological examination disclosed

optic atrophy, total blindness in the right eye, optic atrophy with temporal hemianopsia in the left eye. There was a weakness of the muscles innervated by the third nerve on the right. The remainder of the neurological examination was negative. General physical examination showed evidence of dyspituitarism. Patient was short, obese, had feminine hips, feminine distribution of hair on the pubes, basal rate was low being minus 20 per cent. The sugar curve was flat. Special views of the optic foramina showed them to be enlarged, especially the one on the right. Exploration of the chiasm disclosed a neurofibroma of the optic nerve and chiasm.

Because of the frequent mistakes in the differential diagnosis of brain tumor, Alzheimer's and Pick's disease, together with the fact that the diagnosis can be made easily by air injection, a brief discussion of the problem is fitting here. In the last few years with the aid of encephalography and cerebral biopsy, Alzheimer's disease and Pick's disease are becoming better defined clinically and the correct diagnosis of these two conditions should be made more often during the life of the patient.

Alzheimer's disease is a progressive degeneration in which the outstanding mental symptoms are those of senility in middle age. There is a diffuse degeneration of the cerebral cortex involving all of its layers and most marked in the frontal lobe. There is degeneration of the ganglion cells of the cortex and large numbers of senile plaques are present. The age onset of the disease is from 52 to 63 years. In the early stages there is gradual loss of memory, a disturbance of perception and slurring of speech. In the course of time the patient becomes disoriented in all spheres and is unable to read or write. Terminal spastic contractures may occur. The duration of the disease is from a year and a half to thirteen years.

Pick's disease is characterized symptomatically and pathologically by circumscribed atrophy of the cerebral cortex. This is never symmetrical. The left side is usually more affected than the right. The process may be localized in any part of the frontal, temporal or parietal lobe. Progressive dementia, aphasias, hemianopsias, and quadrant visual field defects are common. There is chromatolysis and degeneration of the first, second and third layers of the cortex. Senile plaques are infrequent. Alzheimer's fibrils are not found. Women are more frequently affected than men. The onset is from the age of 48 to 55. Aphasia of insidious onset is characteristic. The onset and course of the disease in one of my patients could be detected and followed by a perusal of her check book for two years past. She at first began to drop letters from words, then misplaced words in improper order, then gradually lost the ability to write entirely. Epileptiform attacks may occur in either Alzheimer's or Pick's disease. In Pick's disease spinal encephalography usually reveals a focal atrophy which corresponds to the presenting clinical symptom. In Alzheimer's disease the atrophy is apt to be more diffuse, the ventricles are more symmetrical, there is usually greater dilatation of the ventricular system. Recently Benedek and Lehoczky(4) (Brain, Vol. LXII, page 104, 1939) have made use of brain puncture with histological examination of cylinders of brain tissue removed by biopsy. Pick's disease is usually fatal in from three to four years but it may continue as long as ten years. Every suspected case of Pick's disease or Alzheimer's disease should be subjected to some type of air injection preferably spinal encephalogram in order to differentiate the conditions from brain tumor.

## Summary

Brain tumor is found at necropsy in from 3.5 per cent, 6.7 per cent to 13.5 per cent in state hospital material.

Brain tumor may occur in a patient with a major psychosis in which instance it is not necessarily the cause of psychotic symptoms but will undoubtedly aggravate them. Here the problem of the psychiatrist is to recognize the symptoms of a progressive neurologic disorder running concomitant with the symptoms of the major psychosis. An illustrative case is presented.

Far more important are those cases of brain tumor in which the tumor is the cause of the presenting mental symptoms. Meningiomas arising from the olfactory groove are the most important from a psychiatric standpoint because they are benign and operable. If Foster Kennedy's syndrome is well understood and evaluated these tumors can be recognized much earlier and more frequently than they now are.

The brain tumor problem in psychiatry is almost as important as is the problem of syphilis, and it furnishes one of several good reasons for not making too great a separation between neurology and psychiatry.

Such diagnoses as Alzheimer's disease, Pick's disease, arteriosclerotic dementia, encephalitis, and Parkinson's disease should be regarded with a high degree of suspicion until tumor has been ruled out. The burden of proof certainly rests on the psychiatric diagnostician. We as psychiatrists should become more "brain tumor conscious" and air injection should be employed more frequently than it is employed in psychiatric clinics. When it is remembered that the meningioma, a benign operable tumor is the most common tumor producing mental symptoms there is all the more reason for improving our diagnostic skill in recognizing tumor as a cause of mental symptoms.

Illustrative cases are presented together with necropsy, operative and encephalographic studies in patients in whom one or more examiners failed to recognize tumor as the cause of the psychotic symptoms.

## REFERENCES

1. Hoffman, J. L.: Intracranial neoplasms; their incidence and mental manifestations. Psych. Quart., II: 120-147, 1933.

2. W. H. English citation by A. J. Akelaitis. Discussion of Larson's paper. Am. J. Psychiat., 97: July 1940.

3. Larson, Chas. P.: Am. J. Psychiat., 97: 49-58, July 1940.

4. Benedek and Lehoczky: Brain, LXII: 104, 1939.

# RHEUMATIC EPILEPSY[1]

## Sequel of Rheumatic Fever

By WALTER L. BRUETSCH, M.D., Indianapolis, Ind.

In the last decade a number of cases have been reported in the French literature under the term of "cardiac epilepsy"(1-7). The patients, ranging in age from five to sixty years, developed convulsive seizures which in many instances resembled idiopathic epilepsy. On physical examination there was present, in the majority of instances, chronic rheumatic cardiovalvular disease.

The epileptic seizures had made their first appearance from three weeks to eleven years after recovery from rheumatic fever. Prior to the first attack of acute articular rheumatism none of the patients had had a convulsion. Other possible factors which might have caused the seizures, such as congenital defect, syphilis, trauma, brain tumor, etc., were not present, and there was no familial history of epilepsy.

The question was raised whether the chronic rheumatic valvular lesion could be linked with the epileptic seizures. Several theories were advanced as to the possible mechanism of the convulsions in epileptics with rheumatic heart disease. Some observers believed that the valvular lesion brings on circulatory disturbances in the brain (stasis, vascular spasms, anoxemia), thus precipitating the seizures, but in most instances there were no signs of cardiac decompensation. Others suspected minute emboli detaching themselves from the heart valves and lodging in the brain cortex. In chronic rheumatic valvular disease, however, there is only thickening of the valvular leaflets or, if vegetations are present, the fibrous verrucae are firmly grown to the closing border. In general, rheumatic valvulitis does not give rise to embolic manifestations, unless there is auricular fibrillation with the formation of mural thrombi. A few investigators assumed that the epileptic fits were due to cerebral lesions of the same infectious origin as the cardiopathy.

As long as anatomic studies of the brain of such patients were not available, the nature of the process which precipitated the seizures remained obscure. Recent histologic investigations on the life cycle of rheumatic lesions of the brain vessels have shed much light on the question. The epileptic convulsions in these patients are the result of an obliterating rheumatic arteritis of the cerebral vessels with their dependent gross and microscopic areas of cortical infarctions. Rheumatic endarteritis as a sequel of rheumatic fever involving the vessels of the internal organs has previously been described (8, 9, 10), but only in recent years attention has been directed to its presence in the brain, affecting particularly the small meningeal and cortical vessels(11, 12, 13).

The occurrence of the first convulsions as late as eleven years following the attack of rheumatic fever may be explained by the fact that the development of arteritis may take place in the afebrile period, while the rheumatic individual is enjoying good health. The possibility of this complication, leading to serious sequelæ if it involves the brain vessels, appears to be ever present in individuals with rheumatic valvular disease, although widespread and clinically manifest obliterating arteritis seems to occur only in a small number of such patients.

Lennox and Cobb(14) have emphasized that there is no constant anatomical lesion in epilepsy, and only a few patients with extensive cerebral pathology have fits. They postulate some unknown constitutional element in persons who develop seizures follow-

[1] Read at the ninety-seventh annual meeting of The American Psychiatric Association, joint session of the section on convulsive disorders and The American Chapter of the International League Against Epilepsy, Richmond, Va., May 5-9, 1941. Presented in the form of a scientific exhibit at the ninety-second annual session of The American Medical Association, Cleveland, Ohio, June 2-6, 1941.

This study was awarded a prize in the 1940 contest of The Laymen's League Against Epilepsy for original investigative work in the field of convulsive phenomena.

From the Research Department, Central State Hospital, Indianapolis, Ind.

ing organic brain disease. This statement has been repeatedly confirmed. In the Indianapolis material are rheumatic brains with lesions in the same cortical areas, yet the patients did not have epileptic seizures, but presented other cerebral symptoms (12, 13).

In the following the clinical and anatomical findings of three cases with rheumatic epilepsy are described.

## REPORT OF CASES

CASE 1.—*History.*—L. G. B., a woman, aged 42, was admitted with the history of having had convulsions since the age of 16. She had been able to hold various jobs as dishwasher and housekeeper until a few years prior to admission, when the seizures appeared more frequently. At the same time she developed paranoid delusions, and institutional care became necessary.

Physical examination, besides a systolic murmur at the apex and decreased hearing in the left ear, was negative. The pulse rate was 88 per minute, and the cardiac action was regular. The urine showed a moderate amount of albumin and many granular and hyaline casts. The blood Wassermann was negative.

The patient had had measles and whooping cough, but no other serious illnesses. One brother had rheumatism. There was no epilepsy in the family. She had two miscarriages supposedly caused by falling during convulsions. Two daughters are living and well. She was married three times.

In the hospital the patient had generalized convulsions with loss of consciousness, first one to two a week. Later, the convulsions became more frequent, and the year prior to her death epileptic attacks occurred almost daily. With the increase of the seizures a rapid mental deterioration took place. Death occurred at the age of 48 in status epilepticus.

*Postmortem Observations.*—In both hemispheres of the brain multiple large and small infarctions were present in almost all regions (Fig. 1). There was cauliflower-like puckering of some convolutions. The cerebral vessels were free of arteriosclerosis.

Histologic examination revealed widespread rheumatic endarteritic involvement of the cortical and especially of the meningeal vessels (Fig. 2). On the intima of several vessels of the pia-arachnoid verrucae-like structures were noted (Fig. 3). Other small vessels were partly or completely occluded by old or more recent obliterating endarteritis. The rheumatic changes were almost entirely confined to the vessels of the meninges and of the cortex. Diligent search detected only one small occluded vessel in the optic thalamus and in the dentate nucleus. As the result of the diffuse vascular process the cerebral cortex presented a multitude of lesions. They varied from diffuse areas of ganglion cell degeneration to small and large acellular areas (Verödungsherde), in which all the ganglion cells had disappeared. In other convolutions was an occasional connective tissue scar, originating from proliferated vessels and extending over several cell layers (Fig. 4). In some regions groups of convolutions had become necrotic, producing small and large infarcted areas.

On the vessels of the spinal cord were no changes.

In the heart there was chronic rheumatic involvement of the mitral and aortic valves. On the moderately thickened closing border of the mitral leaflet was an elevated rim of vegetations (Fig. 5). A few barely visible verrucous elevations were also noted on the aortic cusps. Weight of heart: 160 Gm. Microscopic examination disclosed a rheumatic heart muscle with minute perivascular connective tissue scars and a few rheumatic endarteritic vessels. There were no Aschoff bodies in the myocardium. The thickened mitral valve consisted of dense almost avascular connective tissue with small areas of calcification, but without foci of lymphocytic cells. A few fibroblasts were in the stage of questionable cell division. Fibrin along the closing edge was not observed.

Other important findings were contracted kidneys. Numerous small renal arteries and arterioles were entirely occluded by dense connective tissue representing rheumatic obliterating changes of long standing. The kidneys were regarded as an example of nephrosclerosis on the basis of rheumatic vascular disease as described by Fahr (15, 16).

On the vessels of the spleen old and more recent rheumatic endarteritic alterations were also found.

*Comment.*—Since there was no history of rheumatic fever with joint symptoms in this patient, it was impossible to ascertain at what age the rheumatic infection had occurred. Rheumatic heart disease, however, may develop occasionally without previous polyarthritis or chorea (17). No significance was attached to the mitral murmur, and the seizures were interpreted as due to idiopathic epilepsy. Anatomic study of the brain and organs disclosed the symptomatic nature of the epileptic fits being caused by a progressive rheumatic process of the brain which very likely had its beginning at the time of the first convulsions at the age of 16. The presence of minute areas of calcification in the vegetations of the mitral valve gave additional weight to this assumption, indicating that the rheumatic changes were of many years' standing and possibly dated back to childhood.

There was no syphilis, and arteriosclerotic plaques were absent in the vessels of the brain. The possibility, therefore, was not present that one was dealing with syphilitic or arteriosclerotic vascular disease. The differentiation of syphilitic and rheumatic endarteritis is not always possible on histo-

logic grounds, and Brenner(10) pointed out that in the past rheumatic arteritis has occasionally been mistaken for syphilitic arteritis.

CASE 2.—*History.*—A. J., a white man, aged 43, was admitted with the following history: At the age of 30 the patient experienced for the first time "sinking spells and fits," but he was able to continue work as an automobile mechanic for the next twelve years in spite of an occasional convulsion. The year prior to admission he was arrested several times on account of his peculiar behavior. When he was brought to the hospital, he was talking continually and it required four attendants to take him to the ward. Within the first month he had an attack of epileptic seizures, following which he was dazed, talkative, belligerent and expressed various delusional ideas.

The patient was well built and apparently in good physical health. The pupillary and other reflexes were normal. No cardiac abnormalities were recorded. He had had measles and whooping cough and claimed to have suffered from "brain fever" and typhoid fever eleven years ago. He denied nervous and mental diseases in the family. The patient's statements were not regarded as trustworthy.

A blood and spinal fluid examination on admission was negative in all reactions.

In the succeeding years, when not given phenobarbital, he had one convulsive attack every two to three months. More often there were epileptic equivalents during which he entered into a state of ecstasy with hallucinations. He worked in the greenhouse and had the privilege to move freely about the hospital. By everyone he was feared for his physical strength and he enjoyed engaging other patients and attendants in fights. At times he displayed a sentimental religiosity. The slight impairment of judgment, which was present on admission, progressed slowly to a moderate degree of intellectual deterioration. He died at the age of 57 of a pulmonary infarction.

*Postmortem Observations.*—The outer aspect of the brain was normal, and dissection into thin frontal slabs showed no gross changes in the cortex. In the left basal ganglia was a small, fairly recent area of cystic softening, the result of atherosclerosis which was present in the vessels at the base.

Histologic examination disclosed in almost every cortical block one or more acellular areas. In many instances it was possible to find the rheumatic endarteritic vessels which were responsible for the damage in the parenchyma (Fig. 6). Most of the endarteritic changes of the pial vessels were of long standing, evidenced by the dense connective tissue which filled the lumen (Fig. 7). Recent proliferation, consisting of intimal cells exhibiting mitotic figures, was observed only once, but not infrequently endothelial cells were noted having large pale nuclei, which were surrounded by pink cytoplasm in the toluidin blue stain, suggesting cellular unrest. The rheumatic process involved mainly the small vessels of the meninges. The cortical vessels were affected to a lesser degree. Once an accumulation of approximately 100 or more pigment-laden granule cells was observed in the cortex. This lesion was interpreted as a fresh, minute area of softening due to vascular occlusion. Cellular nodules, consisting of proliferated macroglial cells, so-called granulomas, or the formation of nodules (Aschoff bodies) originating from adventitial cells of cortical vessels were not observed. In the subcortical white matter, the lumen of an occasional artery was partly obliterated.

Forty-four large tissue blocks from various regions of the cortex were examined, and only six were free of changes. The greatest number of acellular areas and of rheumatic endarteritic vessels was present in the cortex from the vertex of the brain. They diminished in number in tissue blocks taken from the lateral aspect of the hemispheres, and the lesions became even less frequent in the cortex from the base of the brain.

The spinal cord was normal, except for a few meningeal vessels with a thickened wall.

In the heart was chronic rheumatic mitral disease. Along the closing border of the mitral valve an elevated ridge of firm, yellow-white tissue was present. In one place was a large, partly calcified and ulcerated, but bacteria-free vegetation. Under the microscope the mitral leaflet had a characteristic rheumatic appearance. In the dense avascular tissue of the elevated rim a few small calcified areas were observed. On the surface of the closing border was a narrow, localized strip consisting of pigment-laden histiocytes, and in other places small masses of fibrin were seen into which young fibroblasts were growing. Scattered lymphocytic cells were noted only rarely in isolated areas of the thickened valvular tissue. The other valves were normal. The heart was hypertrophied, weighing 490 Gm. In the myocardium there were a few rheumatic endarteritic vessels and several old and recent small scars. Intensive search detected an occasional Aschoff body in the stage of organization.

There were contracted kidneys (nephrosclerosis) as the result of rheumatic arteritis. The organs presented almost the same appearance as the kidneys of case 1, with many small arteries and arterioles in all stages of occlusion. On some vessels the rheumatic changes were still in progression. For instance, in one renal artery fibroblasts in the muscular coat were undergoing cell division, forming an Aschoff-like body and leading to unilateral thickening of the media.

In the lungs(10) and pancreas a few rheumatic endarteritic vessels were present.

*Comment.*—In the presence of rheumatic mitral disease the proliferative intimal changes of the small meningeal and cortical vessels were sufficiently characteristic to be diagnosed as rheumatic endarteritis, although a moderate degree of cerebral arteriosclerosis was superimposed, the latter involving, however, only the vessels at the base of the brain. Furthermore, the first seizures occurred at the age of 30,

when cerebral arteriosclerosis as the cause of the convulsions was very unlikely. A heart murmur was not recorded on admission, but the verrucous tissue of the mitral valve showed calcified areas. It is obvious that when calcification is present, the valve must have been diseased for years. The presence of abnormal heart sounds was either overlooked, or the mitral changes at that time were not extensive enough to make an audible murmur.

CASE 3.—*History.*—L. S., a white man, had rheumatic fever with polyarthritis at the age of 17. One year later he experienced the first epileptic convulsion, and has since had about one seizure per week. Later he became hallucinated and threatened the life of his mother.

On admission to the Central State Hospital at the age of 28 the heart was enlarged to the left, and a loud diastolic murmur was heard over the apex. There were periods when the cardiac action was tumultuous and irregular with a pulse rate of about 100. The blood pressure was 125/75. The pupils and reflexes were normal. The tongue showed many old scars.

The Wassermann of the blood was negative. Spinal fluid examinations in 1927 and in 1935 showed no abnormalities. On admission the urine was negative, but several years prior to his death there appeared a trace of albumin with an occasional granular cast.

In the institution the patient had a generalized convulsion once a week. There was no warning of an oncoming attack. He would fall and lose consciousness. The seizures were interpreted as idiopathic in nature. His memory was fairly good, but in later years a moderate degree of mental deterioration became obvious. The number of seizures increased to three and four per week, and he died following a severe convulsion at the age of 40.

*Postmortem Observations.*—The brain was grossly normal. In one-third of the fifty cortical blocks examined there were one or rarely two small acellular areas. Once a minute scar consisting of pigment-carrying glial cells was observed in the cortex (Fig. 8). Rheumatic endarteritic changes on the small meningeal and cortical vessels were absent.

The mitral valve showed far advanced rheumatic stenosis. Microscopically, there was no sign of recent valvular activity. The heart muscle was normal for all practical purposes. There were no Aschoff bodies in the myocardium.

In the spleen two arteries were occluded by old organized fibrin clots, and in the kidneys two middle-sized small vessels showed obliterating rheumatic arteritis of intermediate age.

Histologic examination of the remaining organs revealed no changes.

*Comment.*—The organic lesions in this brain were of slight degree when compared with patients 1 and 2. This case seemed to show that it is impossible to anticipate the degree of cortical damage judging from the number of the convulsions. The meningeal and cortical vessels were free of rheumatic endarteritic changes. The occurrence in the cortex of acellular areas, also called areas of incomplete softenings, in the presence of an apparently normal vascular tree has been observed previously in mental patients with chronic rheumatic valvulitis. In these instances the acellular areas were small and infrequent, and it is believed that the vascular obstruction due to endothelial proliferation occurred in the capillary bed where this phenomenon could easily escape observation even on careful microscopic examination.

## DISCUSSION

In a consideration of pathologic conditions which are present in the brain of epileptic patients the important question is whether the changes are the cause or the result of the convulsions. During life, in all three patients the seizures were diagnosed as idiopathic epilepsy. In the latter condition histologic investigation discloses nothing or nearly nothing, and the minor uncharacteristic changes, including sclerosis of the cornu Ammonis, are looked upon as the result of vascular spasms(18). In case 1, there were large and small cortical infarctions due to rheumatic endarteritis. In case 2, the brain cortex was grossly normal, but there was extensive microscopic cortical damage. Without the presence of organic lesions of the cerebral vessels some of the tissue alterations in the parenchyma in case 2 could have been attributed to vasospasms. Histologic examination, however, refuted this assumption revealing inactive as well as active rheumatic vascular disease of the meningeal and cortical vessels. It was thus apparent that the seizures represented merely a symptom of a chronic rheumatic state involving the brain, heart, kidneys and to a lesser degree the vessels of other organs. In case 3, although there was present in the grey matter a small number of acellular areas and an occasional glial scar, rheumatic endarteritic changes of meningeal and cortical vessels could not be found. Here the question of vascular spasms could not be excluded

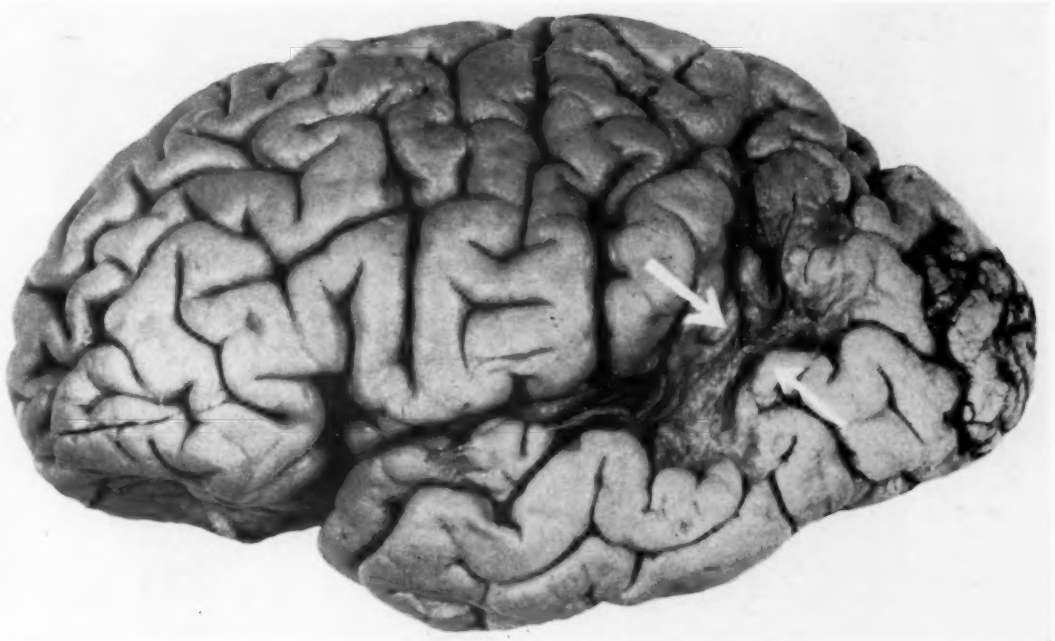

FIG. 1 (Case 1).—Left hemisphere, meninges removed. Large infarction involving parietal-occipital region and extending into temporal lobe. There is a puckered appearance of some of the convolutions close to the longitudinal fissure, known as "granular atrophy of the cerebral cortex."

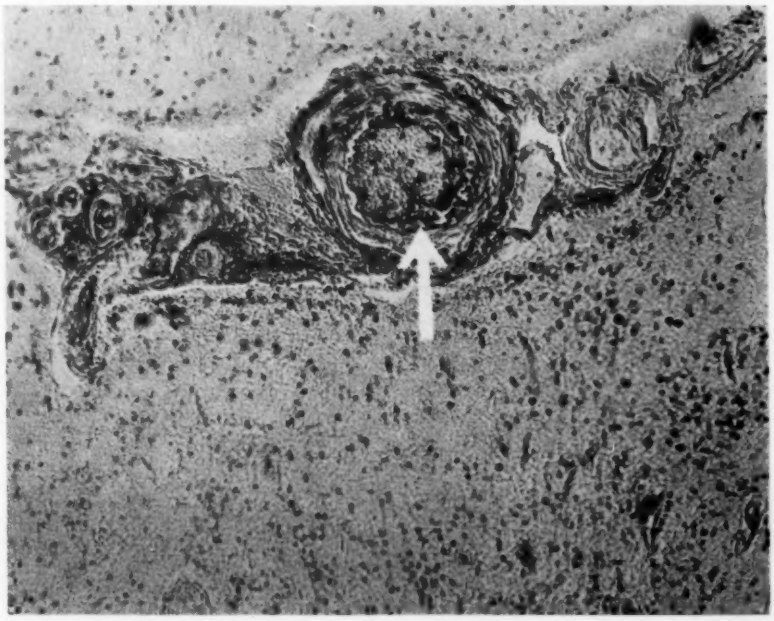

FIG. 2 (Case 1).—Recent rheumatic endarteritis of pial vessel. There are signs of activity evidenced by proliferating intimal cells growing toward the center of the lumen. To the left is a group of newly-formed endarteritic vessels. A large acellular area, involving several cell layers, is present in the underlying cortex. Toluidin blue.

FIG. 3 (Case 1).—Meningeal artery with verruca-like formation consisting of proliferated intimal cells (verrucous arteritis). Toluidin blue.

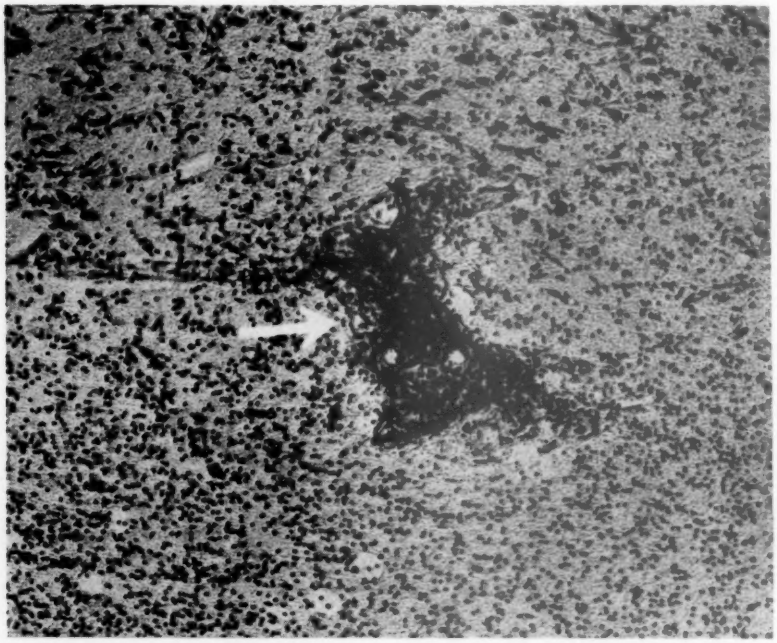

FIG. 4 (Case 1.)—Connective tissue scar made up of a dense arrangement of newly-formed vessels and of proliferated adventitial cells. The scar is on the border between cortex and white matter of the brain. Toluidin blue.

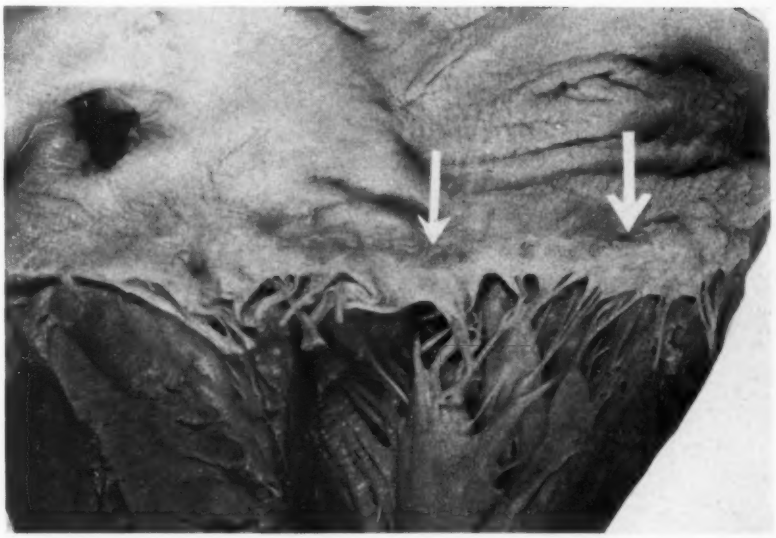

FIG. 5 (Case 1).—Rheumatic mitral disease. On the moderately thickened closing border is an elevated rim of tissue, studded with partly calcified verrucous vegetations.

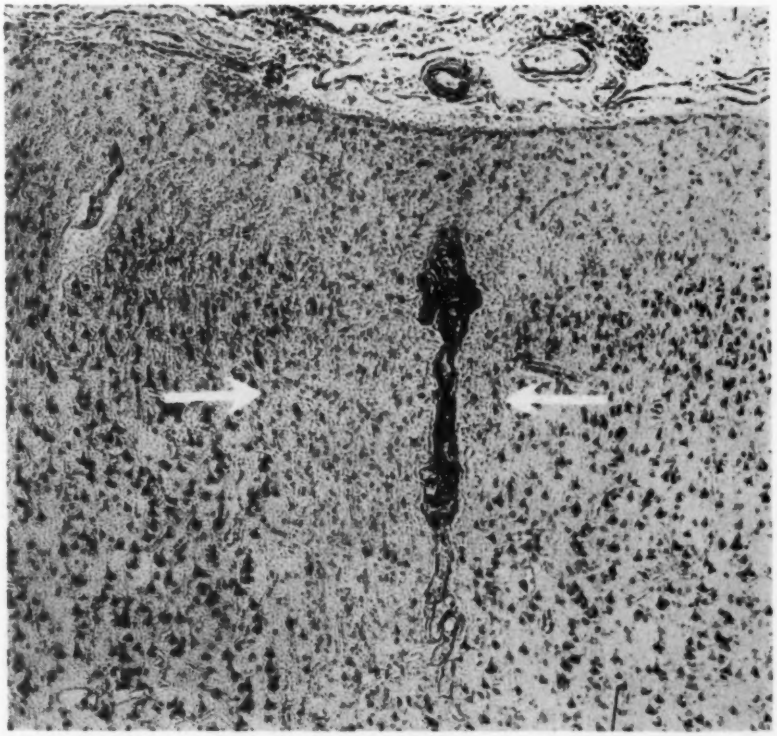

FIG. 6 (Case 2).—Acellular area (Verödungsherd) with cortical vessel showing recent proliferative endarteritis. One intimal cell was observed being in the stage of mitotic cell division. Other endothelial and adventitial cells had swollen nuclei which were surrounded by pink cytoplasm. Toluidin blue.

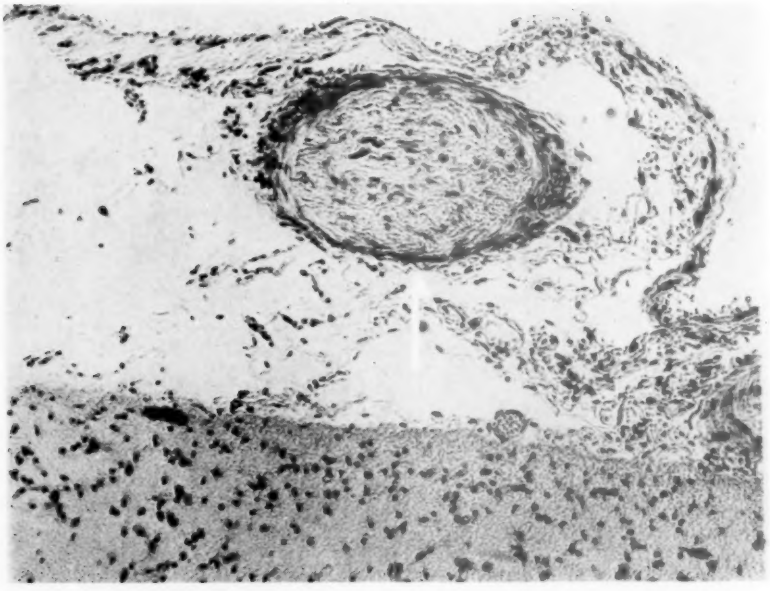

FIG. 7 (Case 2).—Old endarteritic process of small meningeal artery. The lumen is obliterated by dense connective tissue. Toluidin blue.

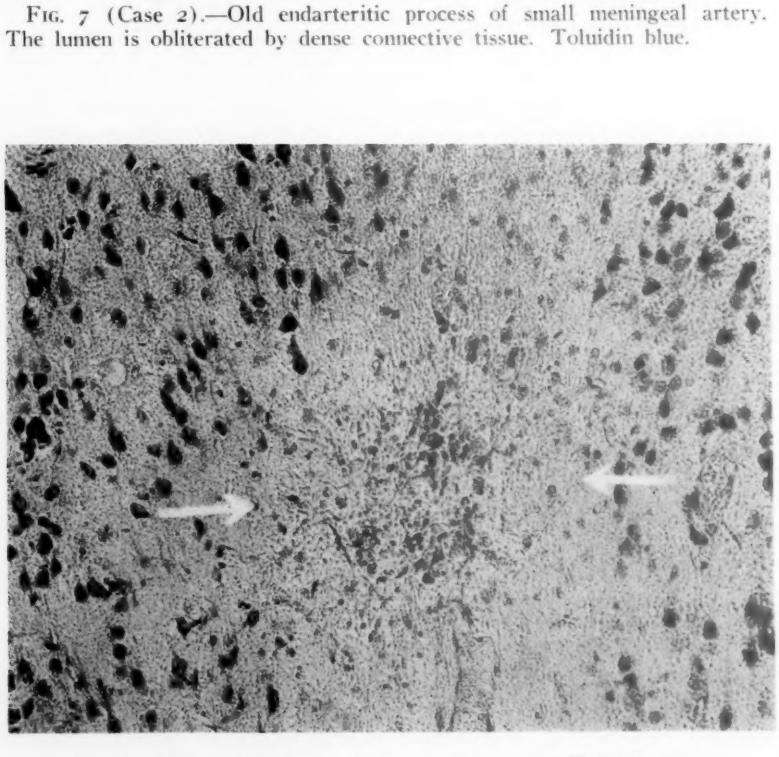

FIG. 8 (Case 3).—Small glial scar in cortex. Toluidin blue.

entirely. However, such changes were absent in the brain of several patients with idiopathic epilepsy, which were available for histologic comparison, even though the convulsions in the idiopathic cases had been more severe.

In persons over 20 years of age the clinical diagnosis of idiopathic epilepsy is made only when all other possible factors have been eliminated. The causes of convulsive seizures are numerous, and a classification on an etiologic basis should be attempted, whenever possible. The term "rheumatic epilepsy" is introduced here having its counterparts in syphilitic and traumatic epilepsy. The term "cardiac epilepsy" has outlived its usefulness because various heart conditions (hypertensive and syphilitic heart disease, paroxysmal tachycardia, etc.) which are associated at times with seizures have been included under this designation.

The recognition of chronic rheumatic infection as a cause of epilepsy is new. In 1936 Walker(19) gave a list of about 70 miscellaneous conditions which produce seizures. Under cardiovascular causes he listed subacute bacterial endocarditis, but not rheumatic endocarditis. Guttmann(20) in the same year, however, expressed the thought that endocarditis may be the link between chorea and other neurologic symptoms. He observed a case with jacksonian epilepsy after what he believed to be an embolism originating from endocarditis, which followed chorea. Later the patient developed also generalized attacks. Judging from anatomic experience one may assume that in Guttmann's case rheumatic endarteritis of the brain vessels rather than an embolus was the precipitating factor of the seizures. Rheumatic arteritis of the cerebral vessels in Sydenham's chorea has been described by von Sántha(11). The likelihood of an old rheumatic encephalitic scar, however, should not be discarded altogether in patients who develop epileptic convulsions following chorea or in the wake of rheumatic fever, particularly if there were delirious episodes during the febrile period. Furthermore, in rheumatic patients who develop convulsions before the age of 20, the possibility should always be considered that one may be dealing with idiopathic epilepsy, not associated with rheumatic disease of the brain vessels.

## SUMMARY

The term "rheumatic epilepsy" has been suggested for patients who develop convulsions following rheumatic fever or chorea, and for epileptic persons with chronic rheumatic cardiovalvular disease. The fundamental process in the brain of these patients consists of a recurrent, obliterating rheumatic arteritis with secondary changes in the cortex.

## BIBLIOGRAPHY

1. Ramond, L.: Epilepsie cardiaque. Presse méd., **38**: 507, April 12, 1930.

2. Gay, G. H.: De l'épilepsie cardiaque, Thèse, Paris, 1930.

3. Urechia, C. I.: Epilepsie cardiaque chez un sujet atteint de cardiopathie valvulaire. Bull. et mém. Soc. méd. d. hôp. de Paris, **48**: 1380, Nov. 7, 1932.

4. Decourt, J.: A propos de l'"épilepsie cardiaque." Le rôle probable de l'infection rhumatismale et de la chorée de Sydenham dans l'étiologie de certaines épilepsies. Bull. et mém. Soc. méd. d. hôp. de Paris, **48**: 1470, Nov. 28, 1932.

5. Urechia, C. I., and Retezeanu (Mme.): Epilepsie cardiaque. Bull. et mém. Soc. méd. d. hôp. de Paris, **50**: 960, June 25, 1934.

6. Babonneix, L., and Gouyen, J.: Pouls lent permanent avec crises épileptiformes chez un enfant de 10 ans atteint de maladie mitrale. Bull. Soc. de pédiat. de Paris, **33**: 255, April, 1935.

7. Giraud, P., Erlande, G., and Bernard, R.: Troubles du rythme cardiaque avec accidents convulsifs au cours d'un rhumatisme cardiaque. Marseille-méd., **1**: 591, May 25, 1938.

8. Von Glahn, W. C., and Pappenheimer, A. M.: Specific lesions of peripheral blood vessels in rheumatism. Am. J. Path., **2**: 235, May, 1926.

9. Karsner, H. T., and Bayless, F.: Coronary arteries in rheumatic fever. Am. Heart J., **9**: 557, 1934.

10. Brenner, O.: Pathology of the vessels of the pulmonary circulation. Rheumatism of the pulmonary arteries. Arch. Int. Med., **56**: 1190, Dec., 1935.

11. von Sántha, K.: Über Gefässveränderungen im Zentralnervensystem bei Chorea rheumatica. Virchows Arch. f. path. Anat., **287**: 405, 1932.

12. Bruetsch, W. L., and Bahr, M. A.: Chronic rheumatic brain disease as a factor in the causation of mental illness. Report of two cases. J. Indiana M. A., **32**: 445, Sept., 1939.

13. Bruetsch, W. L.: Chronic rheumatic brain disease as a possible factor in the causation of some cases of dementia præcox. Am. J. Psychiat., **97**: 276, Sept., 1940.

14. Lennox, W. G., and Cobb, S.: Epilepsy, p. 156, Baltimore, The Williams and Wilkins Company, 1928.

15. Fahr, T.: Kurze Beiträge zur Frage der Nephrosklerose. Deutsch. Arch. f. klin. Med., **134**: 366, 1920.

16. Fahr, T.: Die rheumatische Granulomatose (rheumatisches Fieber, Rheumatismus infectiosus specificus, Rheumatismus verus) vom Standpunkt des Morphologen. Ergebn. d. inn. Med. u. Kinderh., **54**: 357, 1938.

17. Karsner, H. T.: Human pathology, a textbook, fifth ed., p. 243. Philadelphia & London, J. B. Lippincott Company, 1938.

18. Spielmeyer, W.: The anatomic substratum of the convulsive state. Arch. Neurol. and Psychiat., **23**: 869, May, 1930.

19. Walker, A. E.: Convulsive seizures in adult life. Arch. Int. Med., **58**: 250, Aug., 1936.

20. Guttmann, E.: On some constitutional aspects of chorea and on its sequelæ. J. Neurol. and Psychopath., **17**: 16, July, 1936.

# MENTAL DEFECT IN EPILEPSY AND THE INFLUENCE OF HEREDITY[1]

By WILLIAM G. LENNOX, M.D., Boston, Mass.

More distressing than seizures themselves is the mental decay which many patients with epilepsy experience. The picture of the deteriorated epileptic was drawn by Aretaeus of Cappadocia(1) 1800 years ago.

"But if it [epilepsy] becomes inveterate, the patients . . . . are languid, spiritless, stupid, inhuman, unsociable . . . . slow to learn from torpidity of the understanding and of the senses. . . . . The disease also sometimes disturbs the understanding, so that the patient becomes altogether fatuous. The cause of the affections is coldness with humidity."

The description given by Aretaeus cannot be improved upon, but a better explanation for the depressed mental state than "coldness with humidity" should be found.

Although much has been written about the mentality of epileptics, I am not aware of any statistical investigation of the various causes of mental deterioration in a large group of non-institutional patients. Five groups of causes should be considered in any orderly study of the subject. These are:

1. Constitution (heredity).
2. Brain injury which antedated the onset of seizures.
3. Overmedication with sedative drugs.
4. Environment, including psychological and social stresses.
5. The seizures, or the underlying cerebral dysrhythmia.

The author's general impression of the relative importance of these various causes in a group of patients is expressed in the right hand portion of Fig. 1.

The present communication deals with the mentality of extramural patients and with the first of the above mentioned causes; the others will be considered in later contributions. Although clinical impressions and case reports are to be treated with respect, analysis and correlation of the relative importance of the various factors affecting mentality can be secured only by statistical treatment of an adequately large group of cases. The most troublesome feature of such an analysis is the selection of cases. Much misinformation about epilepsy has taken root in the public mind because of the failure to distinguish between data derived from intramural and extramural patients. Epileptics who are not in institutions comprise more than 90 per cent of the epileptic population, and should receive chief attention. Because the number of extramural patients seen by any one person is limited, the plan was adopted of asking members of the American Neurological Association and of the Association for Research in Nervous and Mental Diseases to fill out a printed form for each new patient with epilepsy seen in the coming twelve months. The names of the 78 neurologists who cooperated in this study appear in a previous article(2). In addition, records were secured of 300 epileptic children who attended the pediatrics department of the Ann Arbor Hospital. The bulk of the work of tabulation was borne by Mrs. Herman Erlanger.

The printed blanks which were used asked whether the patient was mentally normal at birth, and whether the mentality at the time of examination was above normal, normal, slightly subnormal, deteriorated or markedly deteriorated. Judgment of the examiner was based on his observation and the patient's history, reinforced in a few instances by psychometric tests. For the sake of simplicity in the presentation of data, blanks which did not give the information asked for are not included in the tabulation. This omission does not materially alter conclusions.

## Mental State of Patients

The great majority of patients in state colonies and mental hospitals are seriously deteriorated. This fact is well known and has colored the popular conception of epilepsy

[1] Portion of a paper read at the ninety-seventh annual meeting of The American Psychiatric Association, section on convulsive disorders, Richmond, Virginia, May 5-9, 1941.

From the department of neurology, Harvard Medical School, and the neurological unit, Boston City Hospital, Boston, Mass. This is No. 37 in a series entitled "Studies in Epilepsy." Aid was received from the Rockefellar Foundation, the Association for Research in Nervous and Mental Diseases, and W. P. A. Project No. 17579.

a dull hue. The condition seems to be getting worse rather than better. Of 4958 new admissions to New York's Craig Colony in a fifteen year period, the following proportion was classified as mentally abnormal(3):

| Years | Percentage classified as mentally abnormal: Males | Females | All patients |
|---|---|---|---|
| 1925-1929 | 81 | 86 | 83 |
| 1930-1934 | 82 | 89 | 85 |
| 1935-1939 | 87 | 91 | 89 |

but there was a wide scattering, and the smallness of the groups neither permits the results to be projected onto the epileptic population nor provides material for statistical analysis. Our present study lacks the exactness of psychometric tests but permits a rough estimation of intelligence in a group which may be considered fairly representative of the epileptic population. Less than 10 per cent of these patients have resided in institutions, which corresponds to

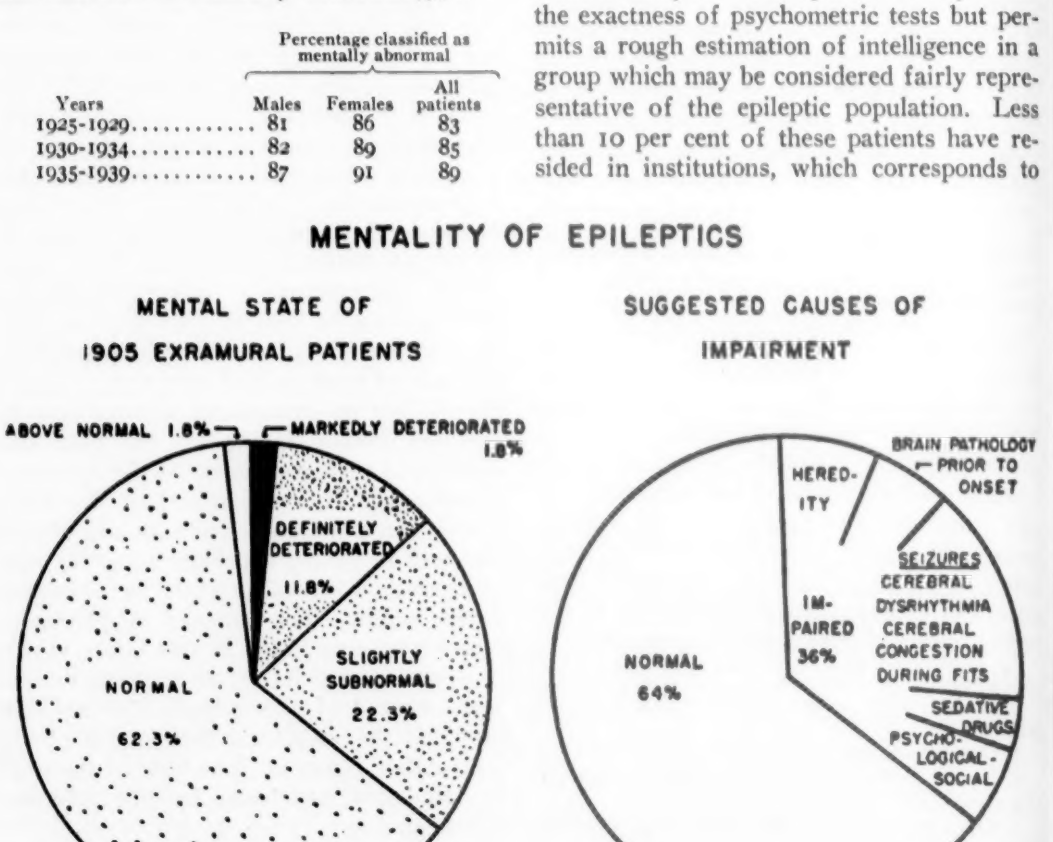


FIG. 1.—The mentality of 1905 private and clinic patients as judged by the examining neurologist (left hand circle) and the author's suggestion as to the relative importance of five different causes for impairment when it exists.

Expressed differently, the patients who entered Craig Colony with a normal mentality fell in a decade from 17 to 11 per cent. The worse showing of female patients is not a peculiarity of institutional patients. The influence of sex on the mentality of epileptics has been examined by Lennox and Cobb(4).

As to the mentality of extramural patients, a number of psychometric studies of small groups of patients have appeared. A summary of results will be found in a recent report by Collins(5). The mean I. Q. of all groups of patients was well below normal, the proportion of all patients in the United States who are institutionalized. The cases dealt with were neither mild nor incipient. The average patient had experienced approximately 2000 seizures, of which 500 were grand mal, in the approximately eight years which had elapsed since seizures began.

The examining neurologists ventured an opinion about the mental status of 1905 of the patients. Their judgment is expressed in the left hand portion of Fig. 1. In round numbers 2 per cent were judged to be above normal, 62 per cent normal, 22 per cent

slightly subnormal, 12 per cent definitely deteriorated, and 2 per cent markedly deteriorated. Thus approximately two-thirds of this miscellaneous group of private and clinic patients at the time of their examination were apparently mentally normal. The proportion of normals is increased somewhat if certain selections are made. Of patients who were mentally normal at birth, 75.4 per cent were normal when examined; of those in this group who had received no brain injury before seizures began, 76.4 per cent were normal. If only the uninjured and congenitally normal group are considered, the proportion of normal patients was 77.6 per cent for males and 79 per cent for patients whose seizures did not begin until between the ages of twenty and twenty-nine years. These modifying conditions will be considered in more detail in subsequent papers.

## Heredity and Mentality

Various devices are available for judging the influence of heredity on the mental state of epileptics. If seizures and mental defect are related genetically, both seizures and mental impairment should be present in an unusual number of the blood relatives of epileptics. The number of affected relatives should be greater if the patient's seizures were "essential," if they began early in life (as this is indicative of hereditary influence), and if impairment of the patient's mentality was congenital. The evidence on these points will be presented in order.

1. *Mental Defect Among the Relatives of Epileptics and of Normals.*—For the most part authors who have written on this subject have concluded that although deterioration similar to that seen in epilepsy was not prominent among the blood relatives of the epileptic, various sorts of neuropsychiatric disorders were frequent. Most of these inquiries have been unconvincing because comparative data were not gathered from nonepileptic persons. A controlled study was made by Stein(6), who compared the personal histories of 6572 near relatives of 1000 epileptic patients with the histories of 4684 near relatives of 722 members of the personnel of state hospitals. The incidence of certain conditions among the relatives of these two groups of persons was as follows:

| Conditions | Percentage of relatives affected | | Ratio of epileptics to controls |
|---|---|---|---|
| | Epileptic | Control | |
| Seizures | 3.7 | 1.3 | 2.8 |
| Feeble-minded | 1.9 | 0.1 | 19.0 |
| Alcoholism | 4.2 | 1.5 | 2.8 |
| Psychosis | 0.8 | 0.4 | 2.0 |
| All neuropsychiatric conditions | 16.7 | 6.0 | 2.8 |

Stein's data indicate that the increased frequency of alcoholism, mental defect, and a variety of neuropsychiatric conditions is as great among the relatives of epileptics (in relation to a control group) as is the history of seizures. He dealt with institutionalized patients among whom mental impairment is the rule. The incidence of epilepsy among the relatives of these patients is approximately 50 per cent greater than for extramural patients. Psychosis or feeblemindedness was present in 2.7 per cent of the relatives of his colony patients, and in only 0.7 per cent of the relatives of our extramural patients. The difference may be due in part to differences in methods of collecting and treating the data.

2. *Mental Defect Among the Relatives of Essential and Symptomatic Epileptics.*—In so-called "essential epilepsy," the seizure tendency is inherent; it is hereditary. In "symptomatic epilepsy" the factor of heredity, as judged by the number of relatives affected, is less than half as great as in the essential group(7). If seizures and mental defect have a genetic linkage, persons who have essential epilepsy should have more relatives with mental impairment than patients who suffer from symptomatic epilepsy. Among our extramural patients one of a variety of neuropsychiatric disorders, aside from psychosis, affected 1.6 per cent of the relatives of "essential" patients and 1.0 per cent of the relatives of "symptomatic" patients. However, relatives who were designated as psychotic differed little in the two groups, 0.6 per cent in the essential and 0.5 per cent in the symptomatic. In these tabulations "psychosis" includes any chronic mental disorder, including feeblemindedness,

and "other neuropsychiatric disorders" includes alcoholism, behavior disorders, and neurologic conditions, but not migraine.

In Fig. 2, the data regarding the 10,902 relatives of 1845 patients are analyzed further to show the comparative distribution of defectives among the fathers, mothers, siblings and children of epileptic patients. In each of these groups of relatives, the number who are mentally affected is greater if the patient's epilepsy is essential. The relative freedom of siblings and children is explained by their youth. More fathers than mothers

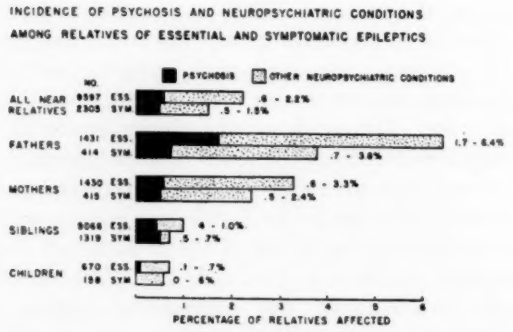


FIG. 2.—The incidence of psychosis and other neuropsychiatric conditions among the near relatives of epileptic patients with reference to whether the seizures of these patients were due to "essential" or "symptomatic" causes. The columns marked "ESS" and "SYM" denote "essential" and "symptomatic" groups. The length of the columns denotes the percentage of near relatives affected. The black portion indicates a mental disturbance, the dotted portion some other abnormality of the nervous system or of behavior. At the end of the columns are the percentage values for the black area and for the total length of the column, respectively. The figures at the left indicate the number of relatives involved, the total being 10,902, of whom 1845 were fathers, the same number mothers, 6385 brothers or sisters and 825 children.

are affected in both the essential and symptomatic groups of patients. In the essential group, a mental disorder was reported for 1.7 per cent of fathers and 0.6 per cent of mothers. Alcoholism, which is much more frequent in men than women, perhaps accounts for the greater incidence of various neuropsychiatric conditions among fathers, but probably not for the greater incidence of psychosis. Gowers(8) also dealt with clinic and private patients. The incidence of insanity among parents of his patients is comparable to ours, fathers 1.5 per cent and mothers 0.9 per cent. On the other hand, Stein(6) found psychosis in 1.2 per cent of fathers and in 1.6 per cent of mothers. Of 2036 United States soldiers with epilepsy in the first world war, mental disease was reported in 1.4 per cent of fathers and in 2.2 per cent of mothers(9). No ready explanation can be advanced for these contradictory reports. When patients are children, the family history is usually given by the mother, who would naturally minimize her own mental infirmities.

3. *Epilepsy and Mental Defect Among the Relatives of Deteriorated and Non-Deteriorated Epileptics.*—If heredity is a factor in the determination of mental defect, and if epilepsy and mental defect are related genetically, then epileptics who are mentally defective should have a larger number of affected relatives than patients who are mentally normal. The disability of these relatives might express itself as seizures or as mental defect, or both. The evidence of heredity should be greatest for those patients whose mental defect seemed to be present at birth, for the earlier in life a familial disorder appears, the greater is the heredity. Decision as to the mentality of an infant is not always easy and the number of patients who were congenitally defective was small, about 14 per cent of the total. In addition, the question of familial mental trouble was answered less often than the questions about epilepsy. These three factors somewhat lessen the weight of the conclusions.

Information was tabulated concerning the family histories of those patients whose mentality was specified. Patients were divided into three groups, those mentally defective at birth, those normal at birth but now definitely or seriously deteriorated, and those normal at birth and now mentally normal or nearly so. The incidence of epilepsy and of psychosis among the relatives of these three groups is shown in the following tabulation. A relative who had both seizures and mental impairment was counted only as epileptic.

The incidence of epilepsy among these three groups was, respectively, 5.9, 3.0 and 2.4 per cent. The incidence of some form of mental disorder was 1.5, 0.7 and 0.7 per cent. Epileptics who were congenitally defec-

| Patient group | No. of relatives reporting | With seizures | | No. of relatives reporting | With psychosis | |
|---|---|---|---|---|---|---|
| | | No. | Per cent | | No. | Per cent |
| Mentally defective at birth | 491 | 25 | 5.9 | 454 | 7 | 1.5 |
| Normal at birth, now deteriorated | 735 | 22 | 3.0 | 608 | 4 | 0.7 |
| Normal at birth, now normal or nearly so | 9041 | 220 | 2.4 | 8246 | 62 | 0.7 |

tive mentally had twice as many relatives with seizures or with a mental disorder as epileptics who are mentally normal at birth. In addition, patients normal at birth who later deteriorated had a somewhat higher proportion of epileptic relatives than those patients who have maintained a normal mentality, in spite of epilepsy. This tabulation therefore indicates that in certain patients epilepsy and mental impairment have a genetic relationship.

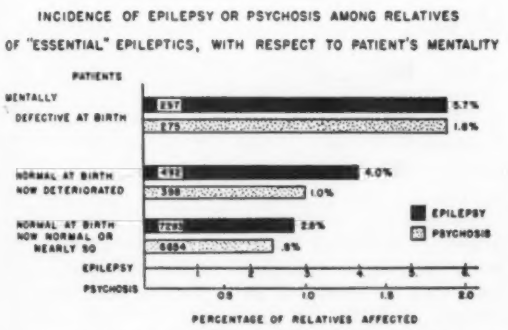


FIG. 3.—Incidence of epilepsy or of psychosis among relatives of "essential" epileptics with respect to the patient's mental state. The columns represent the proportion of near relatives affected with epilepsy (black) or with some mental disturbance (dotted). The scale for epilepsy at the bottom is three times the scale for psychosis. Figures in the columns refer to the number of relatives for whom definite information was available.

The preceding data include both the essential and symptomatic groups of patients. In some of the patients placed in the symptomatic group, the impaired mentality might have been due to an injury to the brain at birth and not to a hereditary defect. The inclusion of these would obscure the results. Computation based on patients of the "essential" groups, those who gave no history of injury to the brain prior to the onset of seizures, is shown in Fig. 3. In the "essential," as in the total group of patients, the presence of congenital mental defect in the patient more than doubled the number of his relatives with seizures or with mental trouble. If the patient was normal at birth but now deteriorated, the number of affected relatives was increased by a relatively small amount, between nothing and 43 per cent.

In reporting the family histories of epileptics, most writers have dealt not with the number of individual relatives affected, but with the number of families, a method which takes no account of the size of the families, nor of the fact that more than one member may be affected. A comparison was made of the present mentality of patients who have a family history of epilepsy with the mentality of those whose immediate family history was negative. In order to avoid complicating conditions, patients who had either congenital mental defect or brain injury before seizures began were excluded from the tabulation. In this restricted group of 1285 patients, 77.2 per cent of those who had no near relative with epilepsy were mentally normal, against 71.7 of those with a positive family history (Fig. 5). This inquiry suggests that if patients were mentally normal at birth, anxiety about the possible appearance of mental trouble or of seizures in siblings or offspring is much reduced.

According to Tredgold(10) 56 per cent of idiots and 11 per cent of feebleminded are subject to seizures. The high incidence of epilepsy in congenital mental disorders is in sharp contrast with the reported small incidence of epilepsy among adults who are psychotic.

4. *Influence of Age of Patients at Onset of Epilepsy.*—On the understanding that an early onset of seizures indicates increased heredity, further evidence is obtained by breaking down the data on the basis of the age of patients at the time of the first seizure (Fig. 4). In both groups of patients, those who are mentally defective and those who are normal at birth, an early onset of epilepsy is associated with a high incidence of epilepsy among the relatives. Unfortunately relatives of the defective group number only 387. Eight and eight-tenths per cent of the relatives had epilepsy if the patients' attacks

began before the age of five, against 3.9 per cent if seizures began after the age of ten. In patients mentally normal at birth the corresponding percentages are 4.3 per cent and 1.9 per cent. Patients deficient at birth who became epileptic before the age of five had nearly 9 times as many relatives with epilepsy as patients who were normal at birth and became epileptic after the age of thirty.

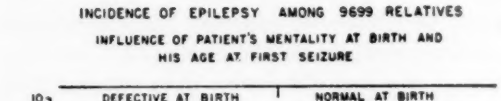
INCIDENCE OF EPILEPSY AMONG 9699 RELATIVES
INFLUENCE OF PATIENT'S MENTALITY AT BIRTH AND HIS AGE AT FIRST SEIZURE
DEFECTIVE AT BIRTH
NORMAL AT BIRTH
387 RELATIVES
9312 RELATIVES
PERCENTAGE OF RELATIVES WITH EPILEPSY
0-4 5-9 10-19 20-29 30+ 0-4 5-9 10-19 20-29 30+
AGE AT ONSET (INCLUDING INFANTILE CONVULSION)

FIG. 4.—The incidence of epilepsy among the relatives of epileptics with respect to whether the patient was mentally normal at birth and with respect to his age at the time of his first seizure. The data include both essential and symptomatic patients but exclude the group of children from the Ann Arbor Hospital because many of these suffered birth injury, which confused the question about mentality. Percentages represented by the height of columns are, from left to right, 8.8, 7.0, 5.1 for the defective group, and 4.3, 2.7, 2.6, 1.7 and 1.0 for the normal group.

## DISCUSSION

This study demonstrates that mental impairment and the tendency to seizures are genetically related. Emphasis must however be placed on two points. First, this relationship holds for only a portion, and this probably a small one, of persons subject to seizures. A relationship is most easily demonstrable for patients whose defective mentality or whose seizures were present at or near birth. Second, in that small segment of extramural patients who are mentally defective, an inherent, hereditary cause is only one of several. As seen in Fig. 5, if antecedent brain injury and congenital mental defect are eliminated, there is no great difference between the mentality of patients with and without a family history of epilepsy.

Study of the electrical waves of the brain offers a possible means for understanding the genetic relationship of seizures and impaired mentality. Almost all patients with epilepsy and the majority of those with psychosis have abnormal electroencephalograms. The pattern formed by the electrical waves of the cortex seems to be a hereditary trait(11). The inheritance of cortical dysrhythmia in epilepsy seems to be established(12). Brain wave studies of the relatives of mentally impaired persons, especially those related to epileptics, should throw new and significant light on the problem under discussion.

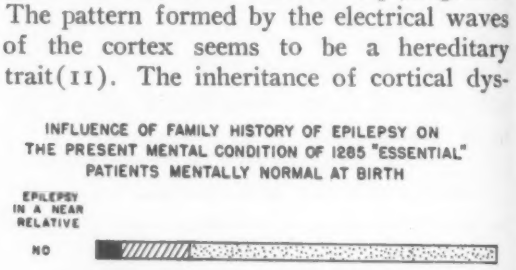
INFLUENCE OF FAMILY HISTORY OF EPILEPSY ON THE PRESENT MENTAL CONDITION OF 1285 "ESSENTIAL" PATIENTS MENTALLY NORMAL AT BIRTH
EPILEPSY IN A NEAR RELATIVE
NO
YES
PERCENT 0 20 40 60 80 100
DETERIORATED
SL. SUBNORMAL
NORMAL

FIG. 5.—The proportion of patients with various grades of mentality with reference to whether the immediate family contained another epileptic. Data refer only to "essential" patients who were mentally normal at birth. If there was no near relative with epilepsy, 6.1 per cent of the 1112 patients were definitely deteriorated, 16.6 per cent were slightly subnormal and 77.2 per cent were normal. If another member of the family was also afflicted, 6.4 per cent of the 173 patients were deteriorated, 22 per cent were slightly subnormal, and 71.7 per cent were normal.

## SUMMARY

Reports concerning approximately 1900 extramural patients have been analyzed with respect to the present mental state of these patients and the determining influence of heredity on their mentality. Among these patients 64 per cent were mentally normal and only 14 per cent definitely deteriorated, in spite of the fact that the average patient had experienced 2000 seizures during a

period of 8 years. The relatives of epileptic patients are more affected by mental disorders of various sorts than the normal population. Patients with essential epilepsy have more relatives with both epilepsy and neuropsychiatric disorders than patients with symptomatic epilepsy. The difference is more pronounced for fathers than for other members of the patient's family.

Patients who were mentally abnormal at birth had approximately twice as many relatives with epilepsy and with psychosis as patients who were normal at birth. Patients whose mentality was normal at birth but is now abnormal have only a few more epileptic relatives than patients whose mentality has been persistently normal. Whatever the mentality of the patient at birth, the earlier in life seizures appeared, the greater was the number of relatives with epilepsy.

These data indicate that heredity plays a rôle in the impaired mentality of certain patients subject to seizures. This rôle is relatively small if patients were mentally normal before the seizures began. Other causes of mental impairment will be discussed in subsequent communications.

## BIBLIOGRAPHY

1. Aretaeus of Cappadocia. Edited and Translated by Francis Adams. London, 1856.

2. Lennox, W. G., and Cobb, S.: Aura in epilepsy; a statistical review of 1359 cases. Arch. Neurol. & Psychiat., 30: 374-387, August, 1933.

3. Data compiled from Annual Reports of Craig Colony, Sonyea, New York.

4. Lennox, W. G., and Cobb, S.: Sex and seizures. Tr. Am. Neurol. Asso., 1941. (In press.)

5. Collins, A. L.: Psychometric records of institutionalized epileptics. J. Psychol., 11: 359-370, 1941.

6. Stein, C.: Hereditary factors in epilepsy; a comparative study of 1000 institutionalized epileptics and 1115 non-epileptic controls. Am. J. Psychiat., 89: 989-1037, 1933.

7. Lennox, W. G.: Science and seizures, p. 202. New York, Harper & Brothers, 1941.

8. Gowers, W. R.: Epilepsy and other chronic convulsive diseases; their causes, symptoms and treatment. London, J. & A. Churchill, 1901.

9. Report of the Medical Department of the United States Army. Volume X—Neuropsychiatry, 1929.

10. Tredgold, A. F.: Mental deficiency. William Ward & Co., 1922.

11. Lennox, W. G., Gibbs, E. L., and Gibbs, F. A.: Twins, brain waves, and epilepsy. Arch. Neurol. & Psychiat. (In press.)

12. Lennox, W. G., Gibbs, E. L., and Gibbs, F. A.: The inheritance of cerebral dysrhythmia and epilepsy. Arch. Neurol. & Psychiat., 44: 1155-1183, Dec., 1940.

# THE TALKING PICTURES IN PSYCHIATRIC TEACHING AND RESEARCH[1]

By LT. (J. G.) ALEXANDER H. LEIGHTON,
*Medical Corps, U. S. N. R.*

AND

THEODORE LIDZ, M. D.,
*Baltimore, Md.*

The advent of the sixteen millimeter sound camera on the commercial market is significant for psychiatry. It is an apparatus which is relatively simple to operate, and the costs are within the means of an educational institution. Sound film recordings have been utilized as an adjunct to teaching and clinical investigation at the Henry Phipps Psychiatric Clinic for the past three and a half years. Since the films have become a valuable aid in the instruction of medical students and have opened new approaches in research, it appears worth while to review our experience and to indicate the potentialities of the technique.

## The Sound Film in Teaching

The demonstration of the psychiatric patient to students has often presented difficulties. Even in schools associated with mental hospitals a patient suitable for illustrating a topic is not always available at the proper time. When the subject is obtainable there is often little certainty that he will behave in the manner desired. The interview in front of the class may become inordinately lengthy before the pertinent material can be reached. The necessity of avoiding sensitive topics in the presence of a group may narrow the presentation to the overt and superficial manifestations. The number of physicians who may utilize a patient for teaching is often limited, because frequently the patient will only discuss his problems with a person he knows well.

The talking picture can never supplant the student's experience of seeing real patients, but if used in a supplementary and complimentary fashion it may overcome many of the difficulties enumerated. The selection of the material can take place when the recording is made. The patient is chosen because he illustrates a topic with particular clarity. The interview should be carried out by a physician with whom the patient feels at ease and who is well acquainted with the patient's story and reaction tendencies. The time necessary for acclimatizing the patient to the interview situation is spent in the studio and not during teaching hours. The material desired for instruction is recorded at the time when the patient is depicting it best and in this form it becomes permanently available. Portions of the interview which are irrelevant are cut out and the essentials are emphasized by captions and the arrangement of sequence.

The psychiatric patient is rarely static: he changes from week to week or from year to year. The patient demonstrated as an elation becomes depressed. The youth who appeared somewhat aloof and vague turns seclusive and talks in neologisms. The expansive paretic is treated and comes to resemble an ordinary citizen. In the usual clinical demonstrations the students see a cross section only, have to accept the word of the instructor that changes occur and have to attempt to imagine the patient in an altered status. The talking picture telescopes time, and the same person may be shown in different phases. He may be seen acting and talking incomprehensibly and then immediately afterward appear as he was months later, recovered and explaining the meaning of his earlier behavior. The essential manifestations of the

[1] The project has been carried out with the aid of a grant from the Catatonia Fund by the Henry Phipps Psychiatric Clinic. Our particular thanks are due to Dr. Adolf Meyer for his help and guidance, and to Dr. Silas Weltmer, Dr. Herbert Harms and Dr. Robert Gardner of the Spring Grove State Hospital, who have made every facility available for the work.

entire course and form of an illness can thus be abridged into half an hour.

The varied symptomatology and the considerable terminology of psychiatry would require a veritable host of patients for adequate demonstration. The cutting, splicing and titling of sound film permits the rapid presentation of good examples which are far more vivid and enduring than text-book descriptions. The selection of a variety of short runs of illustrative film permits the student to compare behavioral patterns which seem confusingly alike when only expressed verbally.

Each psychiatric syndrome covers a wide range of clinical pictures. The student not infrequently gains a rather stereotyped impression from the few cases of each syndrome which are demonstrated. Paresis is conceived to be an illness in which there are expansive delusions and intellectual deficits; schizophrenia may come to mean only bizarre paranoid delusions or catatonic behavior. A film library permits the display of varied material that is useful in orienting the student concerning the differences which appear from case to case.

During interviews with patients things happen rapidly and the student, unfamiliar with what is of significance, finds it difficult to grasp what is offered. In the film, captions call attention to the pertinent features, and the reel may be projected over and over, eliminating the necessity of attempting to have the patient repeat. Furthermore, the students and instructor are free to discuss what appears on the screen without fear of harming the patient.

At the Johns Hopkins Medical School the films are useful and popular. Students form groups outside of the scheduled courses to broaden their psychiatric horizons by seeing more cases than can be shown during class presentations. They make their selections from the catalogue of the film library, and a technician is available to project the films. The small elective courses, for which it is not feasible to obtain patients from the state hospitals, have benefited markedly. It is helpful for the instructors to know that certain material can be demonstrated at any time.

As the films are readily copied, their usefulness is not limited to Johns Hopkins. One other medical school has supplemented its teaching material by obtaining copies of several films; and still others have borrowed. We believe that medical schools where psychiatric patients are not easily available can advantageously supplement their teaching with sound film recordings.

Post-graduate teaching may be furthered. On occasions when members of the Phipps staff were invited to participate in the instruction of groups of psychiatrists preparing for the American Board of Psychiatry examinations in other cities, they have used the recorded material with which they were familiar. They found that this was more convenient than attempting to give precise and brief lectures concerning patients they had never seen before, and that it removed the risk of not being able to find the cases desired in a strange hospital. Sound film projectors can be rented in any large city and the films are transported easily by the lecturer. Groups of medical men other than psychiatrists who wished to familiarize themselves with psychiatric problems and procedures have found it convenient to have the recordings brought to their meetings. Thus it is possible to reach persons who do not have the time or the opportunity to go to the mental hospital for clinical demonstrations.

We should like to suggest that films could be prepared that would be of value to military medicine. Teaching films could be made of the methods and procedures essential in the care of psychiatric patients and used to instruct the new personnel of rapidly expanding hospitals. At induction stations and training camps sound movies could be used to show non-psychiatrically trained physicians some of the important syndromes and thus improve their diagnostic acumen. In the same manner signs and symptoms of neuroses, psychoses and personality disorders could be vividly demonstrated for non-commissioned officers so that they might better understand what to note and report. In actual war zones sound pictures could be made of the war neuroses and their treatment and then utilized far back of the lines for the instruction and preparation of new physicians. In this way, doctors freshly arriving in combat areas would be better

prepared for handling the types of cases they will see for the first time. This is of importance since there is growing indication that such patients should be treated promptly if they are to be saved from chronic illness, and in consequence much psychiatric work may be done close to the scenes of action and there will be correspondingly less opportunity for doctors to see war cases before arriving in combat zones.

## The Sound Film and Neuropsychiatric Research

The psychiatrist deals with the transient, the individual, the situation which never quite recurs. The written record cannot recreate these events and cannot be an objective account. A verbatim shorthand record of a patient's productions and a careful description of his behavior is never free from the prejudices and opinions of the physician who conducts the interview and writes the description. At the very best, the physician can record only what he notices. Furthermore, the clinical picture alters and it becomes difficult to recollect the behavior during an earlier phase; difficult at times even to appreciate that changes have occurred when the alterations from day to day are ever so slight.

The transitory character of the material, the impossibility of noticing everything, and the inadequacy of language for description suitable for objective evaluation appear to us as major factors impeding the progress of psychiatric research. The talking film is a means of overcoming some of the difficulty. The patient can be "fixed" for future reference in a living and dynamic fashion. His productions are made permanent, not as a mere sequence of words but with facial expression, inflection, gesture and precise context. They can be studied with great care by projecting the film repeatedly, focusing attention first on one aspect and then on another. It is akin to the use of stroboscopic light for the examination of moving parts. Features unperceived during the actual interview become apparent. Similarities and differences between patients or symptoms are readily noted when two films are projected in sequence. It becomes possible to collect cases to contrast and compare even though years intervene between their appearance in the hospital, and the same patient may be studied during different phases of an illness. The precise usage of the talking picture as an adjunct in research will vary according to the interests of the investigator, for the potentialities are as numerous as topics for study.

However, it is clear that the sound pictures can be only an adjuvant to the assembling of data by other methods. The film cannot contain the complete history, define the total setting, portray the variations in daily behavior. The film "fixes" and preserves a segment of the patient's life, but the selection of this segment and its relation to the total situation are dependent on the judgment and skill of the research worker. The films, when used in conjunction with the remainder of the record, give it more objective and lasting significance.

At the Henry Phipps Psychiatric Clinic the project has been utilized for a variety of purposes. The experience has been broadest with schizophrenic patients and organic deficit states. We shall describe a few of these by way of illustrating more concretely what has already been said in a general way about the value of sound film in research.

In the study of the speech and thinking disorganizations of the schizophrenic patient, the inability to obtain verbatim recordings by stenographic means of many patients was a stumbling block. The vagueness and unexpected shifts of content made it difficult to follow and write down the patient's conversation. Slowing the spontaneous flow changed the content. With sound film recording the patient was allowed to talk as he desired and repeated reviews of the films revealed meanings which had completely escaped the examiner at the time of the actual interview and new significances were found in the gestures and mannerisms.

The recordings of three patients suffering from aphasic disorders suggest that the sound film may well open a new era in the study of aphasia. No field of medical investigation suffers so markedly from the inability to hold fast to the material. Writing cannot record what the patient says or attempts to say, nor can it record how fully he is able to comprehend. Gesture and expression are

essential to proper evaluation. The mode of interrogation, the dexterity of the examiner, the sequence of the conversation and many other factors affect the responses. There is a devastating disagreement concerning terminology and even as to what an investigator means by his own terms. In the study of aphasia it is particularly difficult to keep the opinions of the investigator from influencing the examination itself as well as the conclusions reached from the study. It is likely that no cases, other than those showing extreme disabilities, are precisely alike. The locations of the lesions differ; the education, intelligence and personality of the patients differ and affect the end result. When the differences between patients is added to the differences between physicians, terminologies and the understanding of terminologies, confusion is not surprising.

The sound camera cannot completely overcome the difficulties which have been mentioned and the many unnamed difficulties which are all too familiar to persons who have studied the aphasic patient, but it can help greatly. The written record is supplemented by the precise illustration of the speech, the range of comprehension, and the manner of groping for words. The differences between the ability to use words in one context in contrast to another are recorded. The attempts at writing are seen in action. The abilities of the same patient at different times can be investigated and cases can be compared, though originally examined years apart. Many investigators can study the same patient and the method of examination can be reviewed and evaluated. When and if the brain becomes available for sectioning, the case material is still at hand in a very living form for re-evaluation in the light of the anatomical report.

The factors influencing perseveration in one patient with a receptive aphasia were analyzed; in a patient with amnestic aphasia the rôle of gesture as a substitute for language was examined, and it was possible to note that it appeared as if the patient were endeavoring to describe clearly-seen images for which he could not find the names.

A patient who had been studied in great detail because his frontal lobe symptomatology differed in many respects from cases reported in the literature was filmed in detail. Despite his death, it remains possible to contrast his behavior with related cases as they come to attention, thus increasing the usefulness of the extensive studies which had been carried out. It is hoped that with time and the utilization of the technique by others, a collection of case material will be assembled which will be available to all workers in the field of brain function and which will enable consensus of opinion to be formed as a foundation for further advances.

This is particularly pertinent now when the war is presenting us with numerous cranial injuries which for the very reason that they are human tragedies obligate us to derive from them what human benefit we can by increasing our knowledge of brain function. In the Franco-Prussian war such knowledge made strides and again during the first world war. However, the cases which were revealing often died or changed and during the war there was little opportunity for thorough study. Now for the first time it is possible to preserve with precision the motor and speech phenomena that are significant. Sound films that are made during these years can be a source of new information and illumination when we are again able to return to the peaceful pursuit of knowledge. However, even in the present the technique has something of value to offer, for it makes it possible to utilize more efficiently what time there is for study and, by helping in the advance of understanding brain function, may save lives and cripplings.

## Technical Remarks

The apparatus essential for the recording of talking pictures is relatively simple and moderately priced. The elaborate equipment of the commercial studio is not essential for the ordinary recordings of interviews. However, there are numerous minor technical difficulties, and the procedure is considerably more complicated than making and editing silent film, so that it is impracticable to establish a project in casual fashion. An acoustically treated studio with a camera booth to eliminate the sound of the camera motor must be built. A technician needs to

be trained to operate the camera, modulate the sound and edit the film. The director of the project should learn some fundamentals of acoustics, that he may understand how to achieve the effects he desires, particularly since the patient is not a trained artist who has been rehearsed, and since the recording must be flexible enough to follow him. The qualities of the studio and the capacities of the apparatus must be studied in detail before actual work with patients is started.

It is possible to construct a studio in which interviews can be held without the patient being aware of the apparatus. Thus far we have not attempted concealment. The patient or the relatives have been asked for signed permission to avoid misunderstandings. The presence of the battery of bright lights, microphone and camera have caused little difficulty. When the patient has appeared ill at ease, a few interviews conducted in the studio and the establishment of rapport by the interviewer outside of the studio have served to eradicate the sensitivity.

## Distribution

The cost of duplicating film is far less than that of the original production, for all irrelevant film may be discarded and the relatively large expenditure for titling does not recur in copying. The Psychological Cinema Register,[2] a non-profit organization which fosters the use of teaching films, is a medium for distribution. Through such agencies, as well as by the direct exchange of films, the productions of one institution can be made available to all interested. L. F. Beck has recently published an excellent review and summary which includes most of the psychiatric pictures.[3]

## Summary

1. The sound film has a number of definite advantages as an adjunct to psychiatric teaching. Selection of case material can be improved, waste of time in teaching hours reduced, discussion can be free without harm to the patient, significant points can be driven home by captions, cutting and reprojecting the film, the whole course of an illness with the changing phases may be telescoped into half an hour, and the sound film can readily be used for instruction at places where the actual clinical material is not available. This may be of special value in military psychiatry, particularly for the instruction of non-commissioned officers at induction stations, and for teaching doctors about war neurosis before their arrival in combat zones.

2. In clinical research sound films are a means of preserving transient behavior and talk for analysis on the screen, for comparison of different phases of illness and for comparison of different patients. Selected segments of a patient's life and test situations can be recorded in a wholly objective manner. Some particular benefits derived in a study of aphasia are noted. It is suggested that very important advances can be made in the knowledge of brain function by using sound movies for the exact recording of behavior and speech disorders resulting from cranial injuries occurring in war.

[2] Psychological Cinema Register. Edited by Adelbert Ford, Lehigh University, Bethlehem, Pennsylvania.

[3] A Second Review of 16-Millimeter Films in Psychology and Allied Sciences, by L. F. Beck, Psychological Bulletin, Vol. 39, No. 1, January, 1942.

# PSYCHOSES AND ALLIED STATES OCCURRING SUBSEQUENT TO THYROIDECTOMY[1]

By MERLE Q. HOWARD, M.D., and LLOYD H. ZIEGLER, M.D.

*Milwaukee Sanitarium, Wauwatosa, Wisc.*

Nervous manifestations have come to be known as a consistent part of the syndrome of toxic goiter. Nervous states of a somewhat similar nature may occur independently of hyperthyroidism. These facts make up a large part of the problem of differential diagnosis when such conditions are under consideration. Attempts to throw light on these matters have come from several sources. The laboratory has made a contribution in the development of basal metabolic rate determination. Thus far the diagnosis of hyperthyroid disorders has been largely in the hands of clinicians, either surgical or internal medical. In the past, psychiatrists have been interested in the occasional association of a psychosis with acute hyperthyroidism. Surgeons have followed their thyroidectomized patients, but not comprehensively enough over a long time. Few, if any, studies have been made which follow thyroidectomized patients to see what nervous or psychiatric disabilities may subsequently appear in their lives. And few studies have been made which follow patients who have had other major surgical operations to ascertain if their subsequent psychiatric disabilities are any different in degree or type or incidence from those that have been thyroidectomized.

Packard(1) in 1909 concluded that psychoses in 82 cases of exophthalmic goiter had no causal relationship to the goiter. In 1924 Foss and Jackson(2) in reporting on 1700 cases of goiter made mention of only two that were acutely psychotic and concluded that psychoses were rare in goiter patients. In 1934 Moersch and Dunlap(3) gave a report on 143 patients in which hyperthyroidism and a psychosis were associated. Three predominating psychotic reaction types were mentioned: toxic exhaustive, acute delirious, and manic-depressive. The first two of these made up 91 per cent of their material (in contrast to the findings of our group), but they state that no reaction type was characteristic of toxic goiter. In 1936 Jamieson and Wall(4) published an account of four patients in which a severe psychosis was related to hyperthyroidism. The psychoses were all different. They felt that thyroid disease does not ordinarily produce a psychosis.

In view of the fact that patients receiving surgical treatment may develop acute or chronic postoperative psychotic states, we were naturally interested in such possibilities. In the first few days after operation an acute psychosis (delirium) is sometimes seen. Doyle(5) in 1928, reporting 28 acute postoperative psychoses seen over a period of five years at the Mayo Clinic, made mention of 5 such that followed immediately after thyroidectomy. The psychosis most likely to be suspected after the acute phases of thyroidectomy have subsided is that related to myxedema. Crowley(6) in 1940, reviewed the literature on psychoses with myxedema, and reported 2 cases of his own. Such psychoses with myxedema, which occur with considerable frequency, may be of many types. In addition, and unrelated to these, the possibility of the coincidental development of psychoses or allied states in persons previously thyroidectomized naturally also attracted our attention. We were also aware of a disposition on the part of some psychiatric patients to seek surgery aggressively. And occasionally surgeons are persuaded to try operations for relief when other remedies had failed in desperate psychotic situations.

The writers had been much impressed by the number of patients seen in their psychiatric and neurological practice who had had a subtotal thyroidectomy. (It occurred to us that we might be thus impressed because the thyroidectomy scar is so readily seen, whereas major and minor operations in general might bear as much relationship to the psychiatric patient. More will be said on this subject

[1] Read at the ninety-seventh annual meeting of The American Psychiatric Association, Richmond, Virginia, May 5-9, 1941.

later.) This led us to review the case histories of all patients admitted to the Milwaukee Sanitarium between January 1, 1925 and April 1, 1941: a period of 16¼ years. Seventy patients were found to have had thyroidectomies. In addition to these, three other patients had come to the Sanitarium on the eve of thyroidectomy because of acute psychotic developments. Still another patient had come, with a history of a mild disorder of many years standing, and obsessed by the belief that she had a "poisonous goiter." A surgeon, induced to operate, merely made a skin incision over the thyroid; this, he and the family called "psychosurgery or placebo surgery" (1925). The patient was not relieved and upon learning the truth soon after the operation had a very unpleasant reaction.

These histories of patients, known personally to one or the other of the writers, are the basis for this study. In retrospect there is much that we should like to know about these patients which was not recorded in their histories. In most instances obvious psychotic states precluded early studies of basal metabolism.

Some clinical data are presented in the following summarized items:

*Item 1. Incidence of thyroidectomized patients:* 70 admitted. Rate of 33.8 per 1000 admitted.

*Item 2. Sex:* Females 57; males 13. *Ratio* of 4+ females to 1 male.

*Item 3. Age on admission:* Median age 44+ years. *Range* 22 to 72 years.

*Item 4. Marital status:* Married 43; single 16; widowed 9; divorced 2.

*Item 5. Occupation:* Housewife 41; teacher 6; no occupation 4; merchant 3; clerk 3; nurse 2; manufacturer 2; secretary 2; accountant 1; bookkeeper 1; printer 1; physician 1.

*Item 6. Residence:* Illinois 27; Wisconsin 26; Michigan 5; Missouri 3; Iowa 3; Ohio, Kentucky, Nebraska, Kansas, Indiana, Minnesota, one each.

*Item 7. Prevalence of nervous or psychotic attacks before thyroidectomy:*

| | |
|---|---|
| No attack | 40 |
| One attack | 13 |
| More than 1 attack | 17 |

*Item 8. Duration of illness leading to thyroidectomy:* (Data meager.)

| | |
|---|---|
| Between 1 to 2 years | 10 |
| More than 2 years | 4 |

*Item 9. Nature of illness leading to thyroidectomy:* (Descriptions not easy to obtain.) Called "nervous," "emotional," "fatigued," "exhausted," "worried," "irritable," "losing weight," "sleepless," "enlarged thyroid," "tremorous"; discovery of high metabolic rate; tachycardia; difficulty in breathing; fear that thyroid might become toxic. (None were reported for cosmetic reasons.)

*Item 10. Total operations on 70 patients:*

| | |
|---|---|
| Subtotal thyroidectomies | 71 |
| Major operations of other kinds | 29 |
| Minor operations | 16 |
| Total operations | 116 |
| Total operations per 100 patients (estimated) | 166 |
| Total operations per 100 women (estimated) | 193 |
| Total operations on 100 women, average age 29, without psychiatric disorder | 59 |

*Item 11. Recovery time after thyroidectomy:* (Data meager.)

| | |
|---|---|
| Over 6 months | 9 |
| Over a year | 2 |

(Many reported that for several months after thyroidectomy considerable improvement occurred.)

*Item 12. Time elapsed between thyroidectomy and first admission to Sanitarium:*

| | |
|---|---|
| Average | 6 to 7 years |
| Range | 2 weeks to 30 years |

*Item 13. "Nervous" or psychotic attacks since thyroidectomy:*

| | |
|---|---|
| One attack | 47 |
| Two attacks | 11 |
| Three attacks | 2 |
| More than three | 6 |
| In a chronic psychotic state since | 4 |

*Item 14. Duration of illnesses leading to admission to the Sanitarium:*

| | |
|---|---|
| Average | 8 months |
| Range | 1 week to 12 years |

*Item 15. Outstanding attributes of illnesses leading patients to be admitted to the Sanitarium:*

| | |
|---|---|
| Depressed (2 tended to be confused also) | 47 |
| Bizarre behavior, hallucinations | 6 |
| Variable states, depression, peculiar mixed states, anxiety associated with Parkinsonism | 6 |
| Memory defects, misinterpreting environment | 4 |
| Elated | 3 |
| Fatigue, exhaustion | 3 |
| Anti-social, unstable, not profiting by experience, emotional immaturity | 1 |

(All were seen by a consulting internist and none were thought to be hyperthyroid.)

*Item 16. Length of Sanitarium residence:*

| | |
|---|---|
| Average | 10+ weeks |
| Range | 2 days to 8 years |

Seven are resident in the Sanitarium at present

*Item 17. Condition on discharge from Sanitarium, or at present:*

| | |
|---|---|
| Recovered | 10 |
| Greatly improved | 14 |
| Improved | 26 |
| Unimproved * | 20 |

* Some of these were known to have improved or recovered later.

From these data, not as complete as one would like them to be, a number of questions occurred to us:

1. Why are thyroidectomies more prevalent among sanitarium patients than among the general population even in the "goiter belt?" The answer in some cases doubtless is that the "nervous" manifestations of goiter are confused with "nervous" manifestations of other kinds. Subtotal thyroidectomy and the proper use of iodine continue to be the treatments of choice for true toxic goiter. In no field of surgery, save perhaps the gynecologic, does the problem of differential diagnosis seem so important as it is when toxic goiter and psychiatric disease must be differentiated.

2. Did any of the disorders of these patients fall into the groups of acute postoperative psychoses of a delirious nature? Only one patient may possibly have shown the late stages of such a disorder in which depression was also present. One other showed an exhaustion type of psychosis, also with depression. Both were admitted within two weeks after thyroidectomy.

3. Were any of the disorders of a more chronic nature associated with myxedema? Every patient was seen by a consulting internist and none were so diagnosed definitely. One patient was given thyroid for a time.

4. Assuming that many of these patients had toxic goiter at the time of thyroidectomy, how does one explain the appearance and recurrence of attacks reported in items 7 and 13? It is very possible to have toxic goiter in addition to a disposition to have recurring psychotic attacks that may get under way before or after thyroidectomy. It is noteworthy that 3 of the patients were thyroidectomized at the onset of an insidious but severe schizophrenic disorder. However, items 7 and 13 suggest that there were patients in whom a more careful psychiatric study might have prevented thyroidectomies. A history of previous "nervous breakdown" or substantial mood swings should suggest more study of the patient than usual if thyroidectomy is under consideration. The recurrence of psychiatric disorders is more likely than the intermittency of toxic goiter.

5. Does toxic goiter cause degeneration of the nervous system? Or does it cause a deterioration of the functional capacity of persons? These questions cannot be answered very positively now. Although neuropathologists generally do not recognize a nervous system lesion characteristic of acute toxic goiter, nevertheless, Wilson(7) felt that there were changes in the sympathetic nervous system that might be related to it. Friedman and Kanzer(8) in 1937 reported the study of a brain and review of literature bearing on the acute effects of toxic goiter on the nervous system. More clinical and pathological investigation must be made to help clarify these matters. With the speeding up of pulse and metabolism it appears that toxic goiter patients may age and their blood vessels may wear out more rapidly. Four of our patients were of the organic reaction type due to senility or arteriosclerosis. Whether such disorders may occur more frequently, or earlier in life, after toxic goiter deserves much more attention.

6. Are psychiatric disorders treated by thyroidectomy with the hope that it may cure the psychosis? The answer is yes, and especially when the psychosis is mild; it has doubtless served occasionally as shock therapy to bring about recovery—proving perhaps to the surgeon and family that the disorder was hyperthyroidism until recurrences necessitated sanitarium care. However, modern shock therapy is to be preferred when indicated.

7. Do patients develop toxic goiter during the course of a psychosis? Yes, it has been seen to occur in one of our patients in which thyroidectomy with a very stormy surgical course had no effect whatsoever on a severe protracted schizophrenic disorder that had been present fifteen years. However, this is known to occur infrequently.

8. And, lastly, will emotional states in time produce toxic goiter? From the evidence at hand and from active experience in a surgical clinic, we believe this to be a very infrequent occurrence. We have seen

toxic goiter develop extremely rarely among neurotic and psychotic patients. While the manifestations of toxic goiter may be mistaken for emotional states, these appear to be separate entities which can have common features, but different origins.

Surgery of the thyroid gland is contraindicated in patients acutely psychotic because of the extreme difficulties of postoperative care and management, leading to a high mortality. Doubtless our patients were not taken to be overtly psychotic at the time of thyroidectomy, but "merely nervous," or "borderline." The critical evaluation of "merely nervous" is a problem requiring psychiatric skill: an achievement of medical education sorely needed and gradually being supplied.

Three patients entered the Sanitarium on the eve of thyroidectomy because of acute psychotic attacks which contraindicated surgery. All of these either markedly improved or recovered. The history of one of these patients is so interesting as to be worth reporting:

A. D., a professional man, 49 years of age, married, had always been quiet and conscientious, with few hobbies. Six months before admission to the Sanitarium he had undergone a major operation from which he had made a good recovery. A month before admission he had noticed fatigue and tenseness. He worried somewhat over minor matters and slept poorly. His appetite fell off and he lost weight. He returned to his physician in a state of tension and restlessness, with a slightly enlarged thyroid. A metabolic study was made and his rate was found to be + 43. He was advised to have his goiter removed and Lugol's solution was prescribed, which he took only a few days. A very tense, anxious, agitated state was precipitated, accompanied by marked insomnia and ideas of unworthiness. His appetite continued to be poor and more weight was lost. Because of his obvious psychotic state he was brought to the Sanitarium on the day he was to have had the operation. On admission his pulse rate averaged 100 and he was more than 10 pounds below his usual weight. The thyroid was found to be slightly enlarged but not nodular. Extremely tense and sad, he declared that he had "such dreadful thoughts." He paced the floor and clenched his fists. He ate poorly and slept little. Nine days after admission, although still sad, he was less tense and his metabolic rate had dropped to + 15. The next day he was given electric shock therapy after the method of Cerletti and Bini(9). The following day his basal metabolic rate was + 7 and he declared that he felt easier. Within the next 6 days he was given 2 more electric shocks. One month after admission he left the Sanitarium and was seen both by his physician and surgeon who declared that he showed no condition which necessitated thyroidectomy. However, he went to another physician who told him that sooner or later his thyroid would have to be removed. This precipitated another acute psychotic state in which suicide was attempted. He returned to the Sanitarium in a condition duplicating that of his previous admission. After 8 electro-shock treatments, given at 2- to 3-day intervals, and much psychotherapy, he made a splendid recovery and has remained well. From a psychiatric standpoint, he suffered from a rather severe anxious depression, with exhaustion, the full nature and understanding of which is far from clear.

In the interest of differential diagnosis, the following criteria for toxic goiter are listed in order of importance (composite opinion of experienced internists and surgeons), indicating by + those which A. D. showed:

TABLE I

| Chief symptoms of hyperthyroidism | Symptoms and signs shown by "A. D." |
|---|---|
| 1. Nervousness | + |
| 2. Heat intolerance | .. |
| 3. Loss of weight despite adequate food intake | .. |
| 4. Fine tremor of the fingers | .. |
| 5. Weakness, especially of the quadriceps muscles | .. |
| 6. Increased sweating | .. |
| 7. Tachycardia or palpitation | + |
| 8. Enlargement of thyroid | + |
| 9. Increased basal metabolic rate | + ?? |
| 10. Exophthalmos | .. |

The "nervous state" which A. D. had can now be called a profound emotional one of depression and anxiety with tenseness, quite different from the so-called nervous state of uncomplicated toxic goiter in which a lowered threshold for motor responses and irritability are often apparent. The appetite loss, so common in states of depression, accounted for A. D.'s weight loss. The pulse rate in psychoses tends to be rapid, but may be very slow. A. D.'s pulse rate has returned to an average of slightly less than 80. Had he been thyroidectomized he should most likely have recovered as a result of the shock of the operation. While A. D. has recovered from an acute psychotic state, one cannot predict that he may never have toxic goiter or another depressive attack, but of the two the latter would seem to be ever so much more likely. His surgeon asked if electric-shock

therapy had any effect on basal metabolism. We have no knowledge bearing on this interesting speculation. The emotional state may markedly affect the so-called basal metabolic rate, as one of us(10) has shown. In this connection it should be emphasized that the basal metabolic determination is a very delicate test, easily disturbed by conditions not always detected, and it is only one of many very important factors in the diagnosis of toxic goiter.

Follow-up studies on persons who have had thyroidectomies deserve much more attention. Every psychiatric hospital usually has several such among its population. The careful review of these affords unusual opportunities for the education of internists, surgeons and psychiatrists.

## SUMMARY

1. The histories of 70 thyroidectomized patients admitted to the Milwaukee Sanitarium in 16¼ years were studied. Clinical data regarding age, sex, residence, occupation, facts before and after thyroidectomy, including Sanitarium residence, are presented.

2. Their psychiatric disorders were chiefly of a functional nature (depression, elation, neurotic) in contrast to psychoses (delirious, exhaustive) usually seen in acute hyperthyroidism.

3. The evidence for acute postoperative delirious or exhaustion states was very slight in the group.

4. There were no cases of myxedema diagnosed by a consulting internist who examined all patients.

5. The prevalence of recurring attacks of psychiatric disorder before and after thyroidectomy makes the coincidence of toxic goiter and such states open to question. It is very probable that in some patients a psychiatric disorder was interpreted as the manifestations of toxic goiter.

6. It seems probable that thyroidectomy has been employed to treat recurring psychiatric disorders and with success because of its shock inducing effect.

7. Toxic goiter has been seen to develop in the course of a profound psychosis of a chronic nature and thyroidectomy was without effect on the psychosis.

8. Whether toxic goiter predisposes to degeneration of the nervous system, or to a deterioration in the functions of a person, is not known. Earlier senility and arteriosclerosis have been suspected.

9. In the study of these patients there seemed to be no positive evidence that emotional states cause hyperthyroidism.

10. The history of a patient who became psychotic and suicidal on the eve of thyroidectomy is presented with differential diagnosis. The patient recovered with electro-shock and psychotherapy during the course of which his supposedly elevated metabolic rate returned to normal.

## BIBLIOGRAPHY

1. Packard, F. H.: An analysis of psychosis associated with Graves' disease. Am. J. Insanity, **66**: 189-201, Oct., 1909.

2. Foss, H. L., and Jackson, J. A.: Relationship of goiter to mental disorders. Am. J. Med. Sci., **167**: 724-735, May, 1924.

3. Dunlap, H. F., and Moersch, F. P.: Psychic manifestations associated with hyperthyroidism. Am. J. Psychiat., **91**: 1215-1238, May, 1935.

4. Jamieson, G. R., and Wall, J. H.: Psychoses associated with hyperthyroidism. Psychiatric Quarterly, Vol. X, 464-480, July, 1936.

5. Doyle, J. B.: Postanesthetic and postoperative psychosis. Anesthesia and Analgesia, pp. 3-7, Sept.-Oct., 1928.

6. Crowley, R. M.: Psychoses with myxedema. Am. J. Psychiat., **96**: 1105-1115, March, 1940.

7. Wilson, L. B.: The pathological changes in the sympathetic system in goiter. Am. Jour. Med. Sc., **152**: 799-812, 1916.

8. Friedman, J. H., and Kanzer, M.: Thyrotoxicosis with psychosis. A clinico-neuropathologic observation in a case. J. N. and Ment. Dis., **85**: 30, Jan., 1937.

9. Cerletti e Bini: l'Elettroshock. Archivio Generale Neurologia, Psichiatriae e Psicoanalisi, **19**: 3, 1938.

10. Ziegler, L. H., and Levine, B. S.: The influence of emotional reactions on basal metabolism. Am. J. Med. Sci., **169**: 68, Jan., 1925.

# FACTORS IN PSYCHOANALYTIC THERAPY[1]

By C. P. OBERNDORF, M.D., New York City

Psychotherapy is a procedure by which we attempt to alter a mental attitude or a physical manifestation of such a mental attitude through the use of the mind itself. The most incongruous circumstance in connection with all psychotherapy is that the mind, the very function of which is in itself crippled and operating imperfectly, must itself be employed in the cure of its own disorder.

The uses of the mind for purposes of therapy may loosely be grouped as direct and indirect. The most common and constant element in indirect psychotherapy is that subtle, elusive force called suggestion operating in its many forms through such agencies as ineffective drugs, mechanical devices, appeals to faith or to the supernatural. These agencies show no scientifically demonstrable effects in themselves in changing the direction, quantity or quality of thought distribution. Nevertheless there is attributed to them by the sick, and sometimes by the person administering them, great but indefinable powers to heal mental disorder.

Therapies, such as occupation, recreation, psycho-dramatics, finger-painting, etc., would fall rather in the category of the indirect method than in the direct since they effect the relief, temporarily, of a major pathological symptom through the withdrawal of energy investment and attention and its mobilization elsewhere. Hypnosis may also be included in the class of indirect psychotherapy even though direct, specific commands are often given by the hypnotist to the patient in the service of cure. The fact that the patient is not in control of his thought during hypnosis and does not subsequently remember what has been suggested to him by the hypnotist excludes hypnotic suggestion from the category of direct psychotherapy.

The recently developed shock treatments which embody distinct psychological elements (such as death threat) are among the most indirect forms of altering ideation and mood. Insulin, metrazol, electric shock, etc., affect directly the course and distribution of body forces and flows. In most forms of shock therapy there is little effort to sway the patient at the time of treatment or immediately thereafter through conversation of any kind.

In all forms of direct psychotherapy, such as persuasion (Du Bois), reasoning (Riggs), individual psychology (Adler), etc., the therapist attempts to influence the thought of a patient through an intellectual examination of its content and through a review of its origin and present validity. Obviously it can be employed only where the patient recognizes his mentation or content, or its symptomatic results as abnormal. Such an approach has for its purpose the demonstration to the patient of set standards of thinking and the proposal of new ones and new interpretations. It is then indicated that it might or would be advantageous for him to apply such revaluations to current reality situations. Eventually the knowledge gained through such revelations and revaluations of his position is utilized by the patient for self-understanding and reeducation. This is sometimes referred to as insight—a term which I think should be restricted to its original meaning—recognition by the patient that his mental condition per se is abnormal. Indirect psychotherapy usually carries with it a strong emotional appeal. Such an emotional element can be, nearly always is, involved in direct psychotherapy.

Every physician engaged in psychotherapy must eventually become aware of the extraordinary difficulties of judging the mode of cure and the causes for failure in many of his cases. This decision is often even more perplexing in cases reported by other physicians in which subtle elements and reactions which the writer may have perceived in his own work cannot be fully conveyed in words. At times in the course of analysis symptoms disappear for which no interpreta-

[1] Read at the ninety-seventh annual meeting of The American Psychiatric Association, joint session of the section on psychoanalysis and the American Psychoanalytic Association, Richmond, Virginia, May 5-9, 1941.

tion had been offered. On the other hand the analyst may laboriously uncover certain psychological correlations, which are a tribute to his professional skill. He demonstrates them to his patient who apparently understands and integrates them. To these two happy circumstances the physician attributes, and justifiably, a favorable change in the patient's behavior. Such a conclusion, however, is at times not too dependable and it is frequently disconcerting for the physician to learn that the supposed cause and results are not anywhere so closely associated as he has been inclined to believe.

For example, a most satisfactory outcome of treatment occurred in a very scholarly fifty-six year-old man who had remained the boy of his eighty-year-old father. When at middle-age he came for analysis he had never indulged in intercourse, was still masturbating, and suffered from many somatic complaints. As a result of analysis he made a successful transition to heterosexuality and married a widow some fourteen years his junior. The marriage has been a happy one—both he (now aged about seventy-six) and his wife are still living. I attributed the favorable results to his appreciation of the mechanisms involved in his condition as brought out by the analysis. The treatment was so satisfactory that he insisted that his younger brother come to me when the latter got into mental difficulties some six years later. Reported the younger brother on the first visit—"John says psychoanalysis is all bunk but you are a good doctor."

The most exact and systematic, the most nearly scientific, of all direct psychotherapeutic approaches is psychoanalysis which attempts to trace the development of attitudes from instinctual urges which form in earliest infancy. Psychoanalysis not only carries its investigations to earlier periods than other forms of direct psychotherapy—such as persuasion and advice—but takes into account unconscious as well as conscious forces and factors. Moreover, the individualistic character of the philosophy of psychoanalysis encourages intellectual independence and eventually independent action on the part of the patient. This philosophy of intellectual self-reliance has rendered the entire procedure of psychoanalysis unacceptable to political bodies advocating unanimity of thought to support and strengthen totalitarianism in politics.

It has long been recognized that some patients suffering from psychogenetically motivated disorders, especially conversion hysteria, do not possess sufficient intelligence to comprehend the intellectual concepts inherent in direct psychotherapy and especially in psychoanalysis. Of course intelligence does not necessarily depend upon education. Therefore at times we find that direct psychotherapy can be appreciated by individuals whose education has been limited but whose natural, untrained intelligence is adequate.

Direct psychotherapy, with all due regard for the emotional reactions which become apparent from the beginning, is primarily intellectual in its approach and presumably the patient proceeds from the intellectual to the emotional and thence to action and activity, for thought precedes intentional action. As definitions of intellectual the writer is content to accept those of the dictionary—such as "perceived by or existing in, the understanding," or "trained intelligence."

The experience of all analysts has shown that intellectual appreciation of the psychological factors involved in the causation, development and fixation of abnormal psychological trends is often woefully insufficient to change them. It has been the fate of every psychoanalyst after many months of conscientious labor with a patient and his illness to discover that while the patient could recite causes held responsible for his mental disturbance and knew mechanisms and interpretations by heart, he had profited little more than had he learned an impersonal catechism by rote. Such a patient discusses his own problems and accepts the interpretations of the therapist as if they concerned somebody else or nobody in particular—certainly least of all himself.

The intellectuality of the analyst's approach is especially apparent in the extremely passive attitude in a type of psychoanalysis preferred by many psychoanalysts to-day, even though this very passivity may provoke positive emotional reactions in the patient. Here the therapist presumably achieves his results through interpretation alone. He acts as an intellectual robot, showing no emotion, but is sympathetically understand-

ing. He may personify the epitome of intellectuality—*i. e.,* highly trained intelligence—to the patient who expects that the physician be not only a just god but an almighty wise god. Such a rôle is by no means unflattering or unwelcome to some doctors in a cultural environment which so exalts intellectuality as to require a college degree to sell pencils in a department store.

In some forms of mental dysfunctioning such as mania, it is obvious even to untrained observers, that this mind, though perhaps normally possessing great intelligence in health, is in no condition to be used in the cure of itself. In other cases, and with these we are concerned, an apparently well functioning mind keeps whatever new concepts it may receive from the therapist well segregated in a separate circuit. There occurs a delay in assimilation and sometimes they may never merge with the main body of thought currents. Such patients, no matter what their presenting symptom, also suffer from varying degrees of depersonalization. How much really enters and actually affects the main current of thought flow is not always discernible or determinable by the analyst. This constitutes one of the great obstacles which blocks any efforts to alter certain pathological states through an intellectual medium.

An example of this type of splitting was encountered in a female patient, aged thirty-six at the time, who came for treatment because of her inability to move in society. She cooperated in the analytic sessions, conducted according to rigid psychoanalytic technique, with an apparently complete understanding. Many infantile traumata clustering around the sexual observations and fantasies concerning her three older brothers seemed intimately connected with her inability to associate with mixed groups. For a period of over six months the relationship of her experiences and sexual drives to intrafamilial attitudes and conflicts was discussed with an apparently complete comprehension on her part.

Then one day she remarked, "I really do not know anything what you are saying. Nothing that you say enters my mind." When I expressed my astonishment at her ability to participate in the analysis, she again affirmed that whatever she had answered in response to my comments had come only from one portion of her mind and that she did not know how the facts upon which she based her intelligent and appropriate replies had ever entered her mind. She did not know that they were there.

This form of mentation had been habitual with her for so many years that she could not definitely recall when it had begun. It was as though the thoughts had entered without any awareness on her part as to when they had slipped in. After I became more acquainted with this unusual mental condition she accepted an analogy which I had offered—namely, passengers entering an excursion boat being checked off by a comptometer in the hands of an agent at the gangplank. Similarly thoughts from without had come into her mind without being clicked off and she had no idea what they were or whence or how frequently they had come. With the undemonstrable registering mechanism of the mind not operating, the main part of her mind lacked the power to muster material from the vast well of accumulated ideas and facts because it was unaware of what they were. The cogent and lucid replies to the analytic interplay may have come by way of a kind of short circuit or eddy near the bank of the conscious thought stream. I may add that this short circuit was never effectually broken by treatment.

Another case comes to mind in which the failure of the intellectual medium, the only possible tool, depended not upon short circuiting but upon a superficial reception of thought and comments. It concerned a young man whose presenting symptom had been a fear of blushing which first developed at the age of seventeen and who also suffered from marked fluctuations in mood, especially agitated depression. He had been under analysis by several competent men, with the second of them for a period of eighteen months in 1933 and 1934. There is no doubt that this analyst, with whom I conferred, had explained to the patient the analytic mechanisms responsible for many phases of his disorder—such as the fear of his father, the Oedipus ramifications, etc. When I subsequently began to treat him nothing of that analysis, or of a third attempt by another

analyst who had worked with him for three months in 1940, seemed to have remained. The patient remarked: "When you are sick, you don't accept what the analyst says"—that is to say, when intellectual processes are in abeyance because of exhaustion or marked depression little progress can be made in the analysis. An important point is that this sickness of mind, incapacitating the patient, seems never to have been fully recognized by the analysts.

The appreciation of the futility of a purely intellectual approach, verbalization and ideation, in psychoanalytic procedure led to emphasis on another phase—namely, that the patient benefit by reliving those incidents concerning which he had previously experienced abnormal interpretations and attitudes or had repressed strong instinctual feelings. The aim was twofold: to allow emotional elements to exercise their effect and to rid the patient of repressed feelings which so often were consciously manifested in an opposite form—such as humility in place of aggression, or a death-like external calm to disguise an inner seething—like the fiery interior of snow-capped volcanos, human Popocatepetls.

Such affects appear so palpably in the transference situation that the analysis of transference is regarded as a main therapeutic device. Both in its positive and resistive manifestations it has become the main focus of many analysts' attention. Nevertheless the stimulus inciting all these emotional reactions in transference and outside of it is almost exclusively intellectual in origin. Revivification and acting out is not always effective because scenes can be relived repeatedly without the affect penetrating the remainder of the personality to any great degree. Only part of the personality participates—sometimes merely plays a rôle. These patients are particularly good examples of separate organisms which, when regarded as a whole, we call a person. They remain as inert in their reaction to reliving as they do to intellectual concepts which are so often perfunctorily received or remain outside the set currents of thought flow.

In striking contrast to those patients who receive incoming impressions into whorls of thought or only on the surface, there exists a type to whom nothing can become real or legitimate unless it be intellectualized. In some persons intellectuality is inseparably associated with morality. Study or any form of intellectual pursuit is proper and approved. Such people are likely to be constantly testing their judgment as a kind of diversion. In one such patient this habit originally began as a sort of compulsion to prevent a waste of energy in the performance of any task. She developed a mathematical interest as a means of showing efficiency although she was not interested in mathematics as such. When she believed that she had used her intellectual capacity in an appropriate and the most productive manner she felt that she had been good—or at least enjoyed a feeling of satisfaction with herself.

Many of her musts, such as meticulously weighing both sides of a question, being on time, perfectionism in thinking and household management were probably dependent upon the compulsion to find an opportunity to justify her using her mind and thinking it out. Her respect for logic and her pleasure from it, especially if many factors were involved in working out a correct conclusion, superseded all other pleasures in importance and permanence. To her, hysterical was synonymous with illogical. Long arguments with her husband in which she would best him were indispensable preliminaries to intercourse. This afforded her a feeling of intellectual superiority after which she felt resigned to a passive physical rôle. This in turn seemed to compensate for a series of polymorphous sexual perversions (heterosexual, homosexual, zoophilic and pedophilic) to an extent almost incredible in a woman who ostensibly was a devoted housewife and mother of four children in a tranquil suburban community.

Such patients forbid themselves any kind of frivolity which interferes with intellectual achievement. Their minds are never idle and although they may report this condition in some such words as "I relax when I start to think," thinking actually has so far replaced every other form of relaxation that it becomes the only manner in which the patient finds he can release himself from tension.

This excessive need for intellectual reas-

surance to achieve equanimity is illustrated by the following instance: A young male patient had been living with a girl for about five years when under the stress of a strong emotional reaction he suddenly decided to marry her and did so within five days. The marriage began to fail immediately after the wedding. The patient, whose conscious conduct in life had been dominated by reason, complained that the difficulty with his marriage lay in the fact that the relationship both before and after the wedding had been emotionally determined and not "figured out." The absence of a previously logically worked out plan for each step to be followed in married life had deprived him of that type of orientation upon which he had been accustomed to rely. Without it he became bewildered, fearful, emotionally paralyzed, ineffectual and discontented both at home and in his work. Soon afterward he parted from his wife.

In these patients the mind is exercised so often in support of conscience that it grows stronger and increasingly dominant. The emphasis of the organism is concentrated in the mind and later mind and conscience (super-ego) become fused. Because of this excessive use of the mind, which in turn creates a love and reverence for it, the mental force becomes narcissistically invested and occasionally eroticized. The rest of the organism comes to rely upon the mind to extricate it from particular difficulties which could only be noticed by a trained intelligence—namely, subtle concepts and fine differentiations in philosophies of morality and conduct. As a result the more the mind justifies an attitude, often originally emotionally determined, the more real and realistic it becomes.

An example of this condition was observed in a female patient, aged twenty-six, a Phi Beta Kappa graduate of Bryn Mawr, who had specialized in mathematics. She was dominated by an overwhelming urge "to be good." To her "being good" consisted in being competent, clever, adroit. Her conscience became efficiency. She recognized that such a conscience was at variance with ordinary concepts of conscience, concerned with morality and duty to one's neighbors, in the Biblical sense, and the obligations of loving and honoring one's parents. The latter considerations were entirely out of her scheme of things.

All her feelings had to be converted into words and her thoughts into sentences before they became real. For instance, if in driving her car she were cut off by another automobilist she would experience a feeling of violent annoyance. But just to feel meant little to her. Before it could become really effective it had to be converted into words. Even words as a vehicle for the affect might not be sufficient to make it real and the affect had to be further elaborated in sentences. She said, "I no doubt hated mother for a long while but until it went into the sentence, 'I hate mother,' I never realized it." Her conscience of intellect ruled her with a pitiless curb. This cultivation and exaltation of the intellect depended upon an identification with her father.

For patients of this type intellectual formulation is indispensable because it stamps the situation as really true. To them it cannot be true unless it is logically demonstrated. Respect for logical ideation, admiration for the acquisition of factual knowledge and for accurate verbalization becomes a substitute when there has been repression or denial of emotional recognition in the form of love. As I have previously pointed out this hegemony of intellectuality, forming the essence of conscience, may come to be regarded by the individual—through identification as a sexual characteristic of either parent—namely as a masculine or a feminine attribute.[2]

Such patients like to be told facts by the analyst. The transference remains essentially on an intellectual plane with little affect but nevertheless it may be effective in altering long standing attitudes. The emotional responses of these patients have been so long blocked that their driving force is impoverished and checked. The force of the transference depends upon the patient's confidence in the intellectual skill and probity of the analyst. Often these patients can be roused from inattentiveness, lethargy, apathy and

[2] Oberndorf, C. P.: Depersonalization in Relation to Erotization of Thought, International Journal of Psychoanalysis, Vol. XV, Parts 2 and 3, April-July 1934.

even deep depression if the analyst allows the conversation to drift into philosophy or indulges the patient either in discussing problems unrelated to his difficulties or in repeating well known analytic truths. All this is the equivalent of being led (intellectually) by the mind of the analyst, who replaces the wise parent, instead of being led (emotionally) kindly and trustingly by his hand. The yearning to be guided or to be taught to guide oneself in the intellectual spheres gradually usurps the place of, the need for being loved.

The intellect of each person varies in scope, depth and power. Where logic has become the rule of life and proof through logic essential for the acceptance of any experience, the analyst in his treatment cannot minimize its force no matter how strongly emotion may be felt by the patient. To the factually-minded patient the faith in the intellect is so great that emotional abreaction alone, even though it may be profound, is ineffective in producing appreciable therapeutic results.

Freud, in discussing the power of the human intellect as compared with that of the human instinctual life, states that the former is relatively powerless. But he adds that "there is something extraordinary about this weakness—the voice of the intellect is low, but it does not rest, until it has achieved a hearing." [3] In those patients in whom the intellect has become almost one with conscience one might paraphrase Freud's comment—"The voice of the intellect is firm and assuring—sometimes it is startlingly clear; it operates insistently and perserveringly."

Notwithstanding the many volumes which have been written on psychotherapy and the vast knowledge which psychoanalysis has uncovered and discovered during the past fifty years, we are still often in the dark as to the specific processes which have produced the benefit achieved through psychotherapeutic procedures. Even such a relatively pure form of intellectual psychotherapy—as psychoanalysis—cannot be regarded as truly scientific. We cannot eliminate entirely the possibility of suggestion which is the elusive basis of all indirect psychotherapy. Informing the patient that certain factors deeply buried but actively operating in the unconscious are responsible for the development of his symptoms and moods, and assuring him that when these are laboriously resolved he will get well constitute in themselves a powerful and protracted form of suggestion.

With the exception of Glover's excellent summary of the responses of experienced psychoanalysts to his questionnaire dealing chiefly with problems of technique in psychoanalysis,[4] there have been few attempts made by psychotherapists or psychoanalysts to collect and jointly examine their experiences with various types of neuroses. Especially striking have been a reluctance to report unsatisfactory outcomes and a proclivity to record mechanisms and successes without allowing a reasonable lapse of time to estimate the enduring accomplishments of therapy.

Unsatisfactory results in psychoanalytically treated cases are known not only to analytic groups but to outsiders as well, both the medical men and the public. Such instances are significantly represented by the "intellectual" patient who is suffering from forms of ideational difficulty which are regarded as peculiarly adapted to psychoanalysis—such as compulsive neurosis. The patient has sometimes tried analysis for varying periods of time with three, four, five physicians—all competent and skilled. But the method or its application have fallen short. Is this due to inherent weaknesses in the method, or for want of a better term, to what we may call the constitutional psychic composition of the patient which vitiates all efforts? Or how often is it due, as I have stressed in this paper, to a lack of appreciation on the part of the analyst that this preponderatingly intellectual method could not succeed because what appeared to have registered intellectually failed flatly because it affected the ideation of only a sequestered portion of the patient's thought currents?

In this presentation the following points have been cursorily discussed in their connection with the curative elements in direct

[3] Freud, S.: Die Zukunft Einer Illusion, Vienna. International Psychoanalytic Verlag, 1927, p. 87. Also Alexander, F.: The Voice of the Intellect is Soft, Psychoanalytic Review, **28**: 27.

[4] Glover, Edward: Technique of Psychoanalysts, London, Bailliere, Tindall and Cox, 1940.

psychotherapy: (1) the effects of the realignment of values through the use of the intellect of the patient; (2) the failure in certain cases to influence through the intellect of the patient because of the short circuiting of thought flow or because of abnormal mood; (3) the curative limitations of reliving or of the analysis of transference without the integration of such interpretations with the merged intellect—super-ego; (4) the evident need for examination of the causes for disappointment in cases apparently well suited to therapeutic success through the use of psychoanalysis.

# CLINICAL AND ELECTROENCEPHALOGRAPHIC STUDIES IN PYKNOLEPSY[1]

By JOSEPH W. OWEN, M.D., and LOUIS BERLINROOD, M.D.

*New York, N. Y.*

The subject of attacks of frequent, brief interruptions in consciousness occurring in childhood has received considerable study since originally described by Fürstner(1) in 1895. The attention of observers generally was attracted to the following characteristics: the attacks appeared in otherwise healthy children as frequent, short, incomplete cloudings of consciousness; running a fairly monotonous course, with little response to therapy; no deterioration; and generally a favorable prognosis. These characteristics, especially the lack of deterioration after years of attacks sometimes numbering as high as 150 a day, and the favorable prognosis, have made such cases stand out from epilepsy and other diseases and have led many to the belief that they constitute a separate disease; though others have considered them to be forms of epilepsy, narcolepsy, hysteria or spasmophilia. In this paper we are presenting an electroencephalographic and clinical study of eight of our cases and an analysis of the literature in an attempt to clarify the nature of this symptom complex.

## Historical Outline

Fürstner in 1895, in a paper on epilepsy, described a small group of cases which he felt simulated epilepsy but were really hysterical in nature. In his cases he then noted that attacks were present in children under the age of seven without epileptic heredity, occurred twenty to thirty times a day, were brief in duration, with eyes turned upward, arms and trunk somewhat tonic, pulse and respiration unaffected. He noted that there were no convulsive motions, and they did not respond to bromides; but he stated that they frequently responded to psychiatric treatment. Bruns(2) in 1896 disagreed with this hysterical basis, pointing out the "missing massivity" that was so frequent in the usual hysterical attacks in childhood. In 1906 Friedmann(3) described similar attacks, calling them narcoleptic absences. He first pointed out their favorable prognosis and indicated features he believed characteristic such as abrupt onset, monotony of attack, and regularity of course. Heilbronner (4) almost simultaneously presented his theory of hysterical causation, giving as one of the major reasons the fact that some cases seemed to recover on bed-rest and isolation. However, he made the mental reservation that they were very difficult to separate from the epilepsies. Mann(5) in 1911 described two cases which he believed belonged in this group, although to our interpretation they seem to fall in the group of the narcolepsies. He showed increased electrical reaction and assumed that spasmophilia caused the attacks. Sedgwick(6) in 1914 described three typical cases of pyknolepsy, found increased electrical reactions and agreed with Mann's interpretation. Redlich(7) and Lewandowsky(7a) in 1915 advanced the idea that the attacks were a peculiar form of epilepsy. Engelhard(8) in 1914, and Westphal(9) in 1932 favored a diagnosis of hysteria. Sauer(10) in 1916, on the suggestion of Schroeder(11), gave this condition the name of pyknolepsy and considered it a subgrouping of the epilepsies. Bolton(12) in 1916, Sachs and Hausman (13) in 1929, and Jelliffe and Notkin(14) in 1934 have all favored this grouping.

Ratner(15) in 1930 presented a complicated hypothesis including pyknolepsy, epilepsy, schizophrenia and narcolepsy in the group of diencephaloses, a disease of the mid-brain, and pointed to what he considered x-ray changes of the sella turcica. Stier(16) in 1923 and Pohlisch(17) in 1922 felt that pyknolepsy was a definite disease entity.

[1] Read at the ninety-seventh annual meeting of The American Psychiatric Association, Richmond, Virginia, May 5-9, 1941.

Study made under a grant from the Child Neurology Research (Friedsam Foundation) to New York University. From the departments of neurology and pediatrics, Bellevue Hospital, New York City.

Stier stated that many cases showed features of hysteria, spasmophilia, and epilepsy, but believed that they merely co-existed with the disease pyknolepsy.

Baudoin and Schaeffer(18) in 1933 described the hyperpnoea test and showed that some epileptic attacks could be brought on in this manner. Moeller(19) in 1936 used hyperpnoea extensively and believed it served as a possible differential diagnosis between pyknolepsy and epilepsy; for, though a few epileptic attacks could be brought on in this manner, all her pyknolepsy cases responded to it. She also felt that alkalinization with potassium sodium citrate frequently precipitated epilepsy but not pyknolepsy; but she did not wish to commit herself on this statement due to the small number of cases used.

Rosenthal(20) in 1935 introduced the idea of a chronic form of pyknolepsy. He felt that pyknolepsy was a variety of epilepsy with good prognosis, but believed that the prognosis was not as good as formerly believed. He described fifteen cases extending many years after puberty, one even lasting as long as twenty-two years and still present at the age of thirty. He felt that spasmophilia was an occasional incidental occurrence and quoted Aron who had observed that in normal school children twenty-five per cent showed electrical hyperactivity of nerves and some twelve per cent positive Chvostek's sign.

Golla, Graham and Walter(21) in 1937 made electroencephalographic studies of six cases of pyknolepsy. They did not describe their cases clinically but stated that each showed a slow delta wave focus slightly posterior to area 19 and area 7 of Vogt.

## Four Cases in which Spontaneous Recovery has Occurred

Case 1.—*Boy 13. Absences began at 6½ years. 5 to 150 per day. Luminal ineffective; ephedrine helped temporarily. Ceased at age 10.*

This case has been previously published in detail(22).

Case 2.—*Girl 14. Absences began at age of 2½. Occasionally accompanied by slight jerking of arms and head and mumbling. 5 to 40 per day. Not affected by luminal. Ceased at 10.*

*Past History.*—A Jewish girl with family history negative for epilepsy, insanity or migraine. The mother has been a mild cardiac since childhood. The patient is the second of two children. Her birth was normal with easy delivery; birth weight 10½ pounds. She did not suckle very vigorously just after birth; otherwise her feeding history was not unusual. She was always somewhat overweight. She sat alone at 6 months; had her first tooth at 8 months; walked and first words at 18 month. Her pubic hair and breast enlargement began about the age of 9 years; menstruation began at 12. Vaccination was at 8 months with temperature of 103° for several days. There was bilateral otitis media at 8 to 10 months; hay fever from 1 to 2½ years; few asthmatic attacks at 2 years.

*Onset of Attacks.*—At the age of 3½ years, while mother was holding patient in her arms on a street car, she noticed that the child closed her eyes as in sleep and could not be awakened for a few seconds. After this there was an attack every few days in which the patient would stop whatever she was doing, stare, roll eyeballs upward, drop lids and flutter them a few times. This lasted 10-45 seconds, after which she would resume activity as if nothing had happened.

The attacks gradually increased in number until around the age of 6, when they reached five to forty a day. At this period it was noticed that they were occasionally accompanied by a few slight jerky motions of the arms and head, and mumbling. On rare occasions the mother thought she saw the child, while asleep, jerking her arms in much the same manner as during the attacks.

At the age of 9½ the patient had a fever of 104° for twenty-four hours. The next day she was well, and the attacks had decreased from forty a day to five a day; from this point on they diminished gradually until they ceased entirely some four to five months later. There has been no evidence of them in the succeeding five years of observation.

As far as her mother knows the factors modifying attacks consist of excitement and embarrassment, both of which seem to increase their frequency.

Her attacks as observed in Bellevue Clinic were as described. The pupils were never fixed. There was no swaying nor taking steps. There were occasional slight jerky motions of both head and arms, during which the head was gradually extended and arms were lifted at the sides, hands open, palms anterior. The duration was from ten to twenty seconds, although once it was timed as long as forty-five seconds. Sometimes an attack could be interrupted by a command when she could carry out an order such as picking up a handkerchief, sitting down, walking; then upon completion of this task she would resume her attacks. She was aware that she had been through an attack but there was complete amnesia for its duration.

Luminal was of no influence, but suggestion was effective on one occasion. At this time she was told by someone that if she would carry a green glass bottle in her pocket, she would be free from attacks. They ceased entirely for twenty days under this suggestion, but further attempts at suggestion were ineffective, as was hypnotism.

*Psychiatric Examination.*—At the age of seven the patient was given competent psychiatric treat-

ment once or twice a week for a period of a year. This treatment was of no influence on these attacks. The psychiatrist's notes at that time revealed that the patient apparently developed attacks shortly after her brother experienced several major seizures immediately following an automobile accident. They were also said to be increased by any frustration and brought on by any discussion of her brother. Her father was very strict and puritanical, and the patient was his favorite. The mother was a rather submissive woman whose attachment to her son was marked, and the patient was apparently very jealous of him. Both parents were very overprotective. The mother devoted practically all her time to watching over the child and hardly let her out of her sight, and the resulting lack of freedom was sometimes resented by the child. There was considerable sex play with her brother, and apparently some guilt feelings regarding it. Psychiatrists then considered that the major conflict was rivalry with her brother, envy of his freedom and the mother's preference for him, and the patient's consequent desire to be a boy.

At the present time our psychiatric observations do not show any unusual personality difficulties. The patient has made considerable progress since the attacks have stopped and she has been granted more freedom by her parents. She has become gradually less timid and passive, more interested in sports, developed social contacts and has fairly well defined and reasonable goals.

*Physical and Laboratory Findings.*—Physical and neurological examinations were negative. Wassermann and L. P. negative. Her I. Q. at the age of 8 was 110; at age of 10, 116; at age of 14, 111.

CASE 3.—*Boy 13. Premature birth, cord around neck and cyanosis. Major convulsions at age 19 months to 3½ years. Minor absences began at age 3½, occasionally accompanied by slight jerking of arms and head. 10 to 50 per day. Luminal ineffective. Ceased completely at 11 years.*

*Past History.*—An Italian boy with a negative family history for epilepsy, migraine and mental disturbances. He was the first child in a family of two. The birth was at 7 months with cord around the neck and cyanosis for about two days; birth-weight, 4 pounds. His mother was given ether and injections; otherwise labor was easy, lasting one and a half hours. The child did not suckle well. He was up to average weight in one and a half months and subsequent development was normal. Weaning was uneventful at 7 months. He sat up at 7 months, stood at 11 months, walked at 15 months, had his first tooth at 10 months, first words at 10 months, first sentences at 16 months. He had measles at 16 months, German measles at 18 months, whooping cough at 23 months, chicken pox at 5 years, rickets from 10-16 months. All of these illnesses were mild. There were frequent attacks of bronchitis in infancy. He was vaccinated at 25 months with resultant mild reaction, tonsillectomy and circumcision occurred at about 3 years of age.

*Major Convulsions.*—At the age of 19 months patient began having mild major convulsive seizures. These were generalized tonic and clonic, lasting 3-5 minutes. There was no tongue-biting, cyanosis or frothing, but there was occasional incontinence of urine and marked flushing during the seizures. There was an aura in which the child would cry out, "Mother, I am cold," and run to her. He would fall without hurting himself. Following the attack he usually resumed his activity without noticeable fatigue or sleepiness. There were no apparent contributing factors to these seizures except that the first one occurred during a mild head cold. The attacks occurred every three to six weeks up to the age of 3½ years. At this time, during one night, the patient had some thirteen convulsions in about twelve hours and developed internal strabismus which has been present to a less extent since. Following this episode, major seizures ceased entirely and have never recurred.

*Minor Attacks.*—Immediately after his last major convulsion (age 3½), he began having frequent short seizures. In these attacks he would suddenly stare, blink his eyes and roll them upward. They occurred ten to fifty times a day, lasted a few seconds and were accompanied by two to three clonic jerks of the arms and jerky extension of the head. During the attacks he would not drop objects or cease any activity except speech. If he were running or crossing the street, he would continue without interruption, avoiding danger. If a question were asked during an attack he could sometimes answer on completion of the attack. He never fell, wet himself, changed color or had increased pulse; and the pupils were unchanged. There was no swaying nor loss of balance. The frequency, duration and character have remained the same from onset to their abrupt cessation at the age of 11. There were no known factors which influenced their frequency or nature. Luminal and suggestion were without effect.

*Physical and Laboratory Findings.*—Medical and neurological examinations were negative except for weakness of the left sixth nerve. Wassermann and tuberculin tests negative. Spinal fluid showed normal pressure, 3 lymphocytes, protein normal. Blood study: 7000 white blood cells, with 58 per cent polys; hemoglobin 12.5 grams; sugar 89, $CO_2$ 59; N. P. N. 30; cholesterol 180. X-ray of the skull showed no pathology except for absent frontal sinuses and clouding of ethmoids. Sella turcica normal. His I. Q. at the age of 9 was 88; at present 100.

CASE 4.—*Girl 15.—Absences began at age of 5. 2 to 100 per day. Ketogenic diet abolished attacks for 8 months. Luminal not effective. Attacks ceased entirely one year ago. Were not affected by onset of menstruation at 10 induced by drugs.*

*Past History.*—A Jewish girl, the third child in family of four. There was no history of epilepsy or insanity in the family. The maternal grandmother had migraine.

Her birth and development were normal. Ill-

nesses consisted of discharging glands of neck on both sides at the age of 10 months; whooping cough at 5 years, fairly severe lasting 6 weeks with much vomiting during paroxysms. There were mild attacks of chicken pox at 5½, scarlet fever at 6, German measles at 7.

*Onset of Attacks.*—At the age of 5, two months after cessation of whooping cough, the patient was walking along the street when she suddenly stopped, threw her head backwards slightly, stared, blinked her eyes, passed urine. This was repeated in identical manner several times in the next few days; then the attacks continued but there was never any more incontinence. In the beginning the attacks occurred two to three times a day but they increased gradually over the next two years until she was having as many as a hundred a day. For the first year or two she would drop anything in her hand during the attack, but later this symptom was not present. She might even continue any automatic motion she was performing, such as wiping dishes, although apparently entirely unaware of anything happening around her. As years went on, the only other changes were that instead of her head being drawn backwards, it tended to fall forward slightly and there were added some occasional jerky motions of head and arms.

Luminal was not effective. At the age of 7 she was hospitalized and given ketogenic diet for five months. The attacks completely disappeared for 5 months. She was discharged on this same diet, had no further attacks but developed pain in the right inguinal region. A return to her regular diet brought the attacks back in full force. Later she had her right kidney removed (nephrolithiasis) and since this operation the attacks have never been as frequent—four to five a day. Some three or four months after the operation she was given injections to bring on menstruation as a physician felt this might cause her attacks to disappear. The nature of the drug given is not known; however, menstruation and breast enlargement began about two months later at the age of 10½ but did not influence the attacks in any way. They ceased gradually without apparent cause two years ago at the age of 13½.

Attacks have been seen repeatedly in our clinic, both spontaneous and those induced by hyperventilation. During this period she stopped whatever she was doing, swayed slightly forward, did not drop anything in her hand, rolled eyeballs slightly upwards, and fluttered eyelids a few times. She did not respond to commands or remember anything happening during attacks. During the attack there were occasionally slight rhythmic grasping motions of both hands, and the arms might be lifted jerkily at the sides and head jerked slightly. The pupils were not fixed and there was no change of posture, color or pulse. The attacks lasted three to ten seconds. She was not confused afterwards and resumed whatever she was doing as if nothing had happened. She usually knew she had had an attack, as she found she had stopped whatever she was doing and had to begin again.

She thought that pleasurable excitement precipitated attacks and gave as an illustration that when she was going to camp she was overjoyed and immediately had an attack. After a sleepless night such as one occasioned by neighborhood noise, the attacks seemed to be more frequent. She believed she rarely ever had them while reading. Intercurrent fever abolished the attacks temporarily. They were not changed by depression, crying, anger, exciting stories or laughter. There has never been any evidence of attacks at night or major seizures.

*Physical and Laboratory Findings.*—Old nephrectomy scar on right; and resulting scoliosis. Neurological examination and Wassermann negative. Her I. Q. at the age of 7 was 124; at present 122.

## Four Cases of Pyknolepsy in which Attacks are Still Present

Case 5.—*Boy 8. Absences began at age of 3, 10 to 100 daily. Drugs and diet ineffective. No major seizures. No change since onset.*

Abstract omitted because of lack of space.

Case 6.—*Girl 10. Absences began at 8. Frequency 2 to 50 per day. No major seizures. Luminal apparently caused cessation for one week.*

*Past History.*—A 10-year-old Jewish girl. Family history is negative for epilepsy, migraine or insanity. Mother has been a fairly severe cardiac since childhood. The patient is the first of two children. Her weight at birth was 4 lbs. 11 oz. She was weaned at one month because of her mother's mild heart trouble. Her development was normal except for teething which occurred at 14 months. There was vaccination at 6 months with mild reaction. There were mild attacks of measles at 4; mumps and chicken pox at 5; T. and A. with ether anesthesia at 4. Between the age of 4½ and 5½ years there were almost daily attacks of vomiting. The diagnosis was uncertain and the appendix was removed in an attempt to alleviate this condition. The appendix was normal and the operation gave no relief. The condition was finally overcome by decreasing the amount of food given, so it was eventually considered as having been due to overfeeding.

*Onset of Attacks.*—The present illness came on about the age of 8. The mother attributed the onset to a fright which the child experienced several days previously when a Negro man, apparently drunk, caught her roughly by the arm. She remained stiff with fright for several seconds. Several days later she began having seizures in which she would stop walking and talking, stare blankly, blink her eyes, roll the eyeballs upward and sway slightly backwards and forwards. Occasionally she would take a step or two forwards. If she bumped against a table or similar object she would catch hold for support. She would retain objects she might be holding. The only activity that was not interrupted by the attack was that of chewing. After the attack was over she would resume activities as if nothing had happened but there was complete amnesia for this period.

In the beginning the attacks occurred two to

thirty times a day and have increased steadily to as many as fifty a day. Their duration is from twenty to forty seconds. There has never been any incontinence or color change. On one occasion luminal apparently caused their cessation for one week, but though continued in the same dose, the attacks resumed their previous frequency. The only difference noted since onset besides the increase in frequency was the mother's observation that in the beginning she seemed somewhat spastic during the attack and if the mother took hold of her arms she would find them rigid and the child would not change her position. Later during the attacks the mother found her rather limp and she could take hold of her arm and lead her away easily during the episode.

The mother believed the attacks were more frequent in hot weather and increased with anger and excitement, and this was especially true with pleasurable excitement. Attacks were fewer during play. If playing actively she might have four to five hours of freedom. Several months ago she was in a bus coming to the hospital. It appeared the bus stopped suddenly to avoid a collision—a number of people were thrown off their feet but the patient was seated and was not injured. She immediately began having a great increase in attacks. They occurred about every five minutes for the next three days with the exception of the periods of sleep.

She has been followed for 2½ years in our clinic. During the attacks the pupillary reaction was rather sluggish but pupils were not fixed nor altered in size. The child lowered and blinked her eyelids ten to fifteen times and the head seemed to be extended slightly. The eyeballs rolled upwards. There were a few rhythmic motions of the jaw. There were no other motor manifestations noticed, although once the left arm was raised slightly to the side. An attempt to push the child off her feet during the seizure resulted in her grasping at objects to keep from falling. There was no recollection later of this procedure. During one seizure she accepted the physician's flash-light but did not know at the end of the attack where she had obtained it.

*Physical and Laboratory Findings.*—Neurological and medical examination negative. X-ray of skull negative; sella turcica normal. Blood sugar, 100; calcium 10.4; phosphorus 4.8. I. Q. 100.

CASE 7.—*Boy 8½. Absences since age 2½. 20 to 100 a day. Not affected by luminal or diet. Tonic spasm while weaning at 9 months. Attacks* unchanged since onset.

*Past History.*—An 8½-year-old Russian-American boy with negative family history for epilepsy, migraine and mental disturbance. He was the second of three children. Birth and development were normal. At 1 year mother was attempting to wean him by trying to get him to drink out of a glass. He resisted and was crying lustily when suddenly he went into a generalized tonic spasm, body arched, head back, eyes rolled up, all lasting a few seconds. No further attacks occurred and weaning was otherwise uneventful. He had a fall from a carriage at the age of 1, falling three feet on his head. He was not unconscious and only mildly bruised.

*Onset of Attacks.*—At the age of 2½ he began having attacks of a few seconds' duration occurring some 50 to 100 a day, in which he would stop whatever he was doing, flutter his eyelids and roll his eyeballs upwards. There was a tendency to sway backwards and forwards slightly during this period. During the attacks there was slight contraction of the pupils and they were momentarily fixed to light. There were a few champing motions of the jaw and occasional mumbling. He did not drop objects he might be holding at the time. He knew he had experienced an attack. He resumed activity immediately afterward as if nothing had happened and had complete amnesia for that period, occasionally did not even know the attack had occurred. Crying and outbursts of anger seemed to precipitate the attacks but there were no other factors known to influence them. Luminal and ketogenic diet were without effect.

The attacks have remained unchanged since onset with the exception of one experience at the age of 8. At this time he was fighting with his brother over some possession when he stopped in the middle of it with an attack, accompanied by a few jerking motions of his arms across his chest. This was the only time in which any jerking of extremities had been noticed.

*Physical and Laboratory Findings.*—Narrow palate; large, heavy teeth. Neurological and medical examination negative. Spinal fluid negative, 2 cells, both lymphocytes, normal pressure, normal proteins and chlorides. I. Q. 90.

CASE 8.—*Girl 14½. Absences began at 8 years, 2 months after fever with delirium. At first 10 to 100 per day, now 2 to 3 daily. Pupils fixed in attack. No change with luminal or diet, but massive doses of bromides effective temporarily.*

*Past History.*—A 14½-year-old Italian girl, the youngest in a family of eight healthy children. Her father has been in a hospital for many years for schizophrenia; her mother has long-standing migraine. There is no epilepsy in the family. Her birth was normal. The mother nursed the patient until she was 2 years old, was rather vague about the reason, saying she "did not know how to wean her." Development was normal. At the age of 15 months she had a severe attack of measles with high temperature. There were mild cases of mumps at 3; diphtheria and whooping cough at 4.

At the age of 8 she had a fever diagnosed as influenza. She had a high temperature and was delirious, with confusion and hallucinations of fish on the wall and people approaching. During this period she slept more during the day than at night.

*Onset of Attacks.*—At the age of 8, some two or three months after the attack of delirium, she began to have attacks in which she would suddenly stare into space and seem in a daze and blink a few times. These lasted a few seconds and occurred ten to twenty times a day. Their frequency gradu-

ally increased over the next twelve months to as many as a hundred a day. Then they gradually decreased to their present frequency of 2-3 a day. They have not been influenced by ketogenic diet or luminal. Bromides in large doses did decrease their frequency markedly for two months but had to be discontinued because of development of bromide furunculosis.

The patient and her family have noticed the following circumstances modifying the attacks: They were more frequent when the patient was relatively quiet, such as sitting in school. They were increased by anger and any sort of tension, as examinations. She frequently had attacks when fighting with her brother, and if struck at such a time did not remember it. Fatigue and lack of sleep increased them. They were less during the summer months. During marked activity, such as bicycling, swimming, dancing, skating, etc., they were either absent entirely or very rare. Intercurrent fevers did not affect them. The patient has noticed that during hyperpnoea to bring on attacks, if she concentrated on an object like a window, she could sometimes ward off an attack or postpone it; if looking at a blank wall the attack would come more rapidly. There have never been any attacks at night. She has noticed that none occurred during smoking.

The patient has been under observation in the Bellevue Clinic for the past four years. The typical attacks consisted of stopping whatever she was doing and staring, with slight dropping and fluttering of the lids, a few champing motions of the jaw and slight mumbling. The eyeballs were not moved; pupils did not change size but were momentarily fixed to light. When standing she tended to sway and would occasionally take a few steps backwards to catch herself. She would then catch hold of anything she struck to steady herself. During the attack there was no change in color nor pulse but there was complete amnesia for the duration of the attack. She knew she had just had one as "there is a brief sensation of light coming back." Occasionally following hyperventilation there have been a few jerking motions of the arms. These have very rarely occurred spontaneously.

She began menstruation at 14, without appreciable change in attacks, though they had been gradually decreasing for the previous three years.

*Psychiatric Examination.*—Details of psychiatric examinations have been omitted in the previous cases because they showed very little deviation from the normal. In this case, however, the patient had been subjected to very bad environmental factors which require mention. Her mother and father quarrelled continuously for the affection of the child from her infancy. The father was extremely jealous, and eventually attacked the mother with a hatchet while she was in bed with the patient. This episode, however, occurred about one year after the onset of the attacks. The patient shows marked aggressiveness, identified herself with boys and is apparently rather free sexually. Her dreams and phantasies are filled with a desire to become a boy.

*Physical and Laboratory Findings.*—Neurological examination negative. Serology negative. Sella turcica is of rather infantile type; floor somewhat irregular; clinoids normal. $CO_2$ 47. Sugar tolerance fasting 100; ½ hour 102; 1½ hours 100; 2½ hours 89. I. Q. 100.

## Special Features of This Series

### Psychiatric Observations

All of the 8 cases presented were given psychiatric examinations. Only case 8 showed unusual variation of personality or environment. In the entire 8 cases there was no evidence that psychic factors played any definite part in causing the pyknoleptic attacks. We were generally struck with the fact that these children had been subjected to a great deal of attention from their overanxious parents who usually had accompanied them wherever they went for fear that the attacks might prove dangerous. As a result they were usually spoiled, timid and somewhat retarded in their social development. There has not been any evidence that these attacks were used to gain attention, or were definitely precipitated by emotional factors. They usually ran their course regardless of outside circumstances. Generally speaking, it would seem that if attacks of pyknolepsy were on a hysterical basis, there would certainly have been a greater variation in their patterns and frequency, and evidence of definite relationship to difficult situations.

Intelligence Quotient Before and After Cessation of Attacks

| | Attacks began at | I. Q. during periods of attacks | Attacks ceased at | I. Q. after cessation of attacks |
|---|---|---|---|---|
| Case 1..... | Age 6½ | Age 7—112 | Age 10 | Age 13—125 |
| Case 2..... | Age 3½ | Age 8—110<br>Age 10—116 | Age 10 | Age 15—111 |
| Case 3..... | Age 3½ | Age 9— 88 | Age 11 | Age 13—100 |

It would seem from the above table that the intelligence quotients usually remain about the same or are slightly increased after the cessation of attacks. As these observa-

tions extend over a period of from 4 to 7 years they would tend to indicate that as far as intelligence is concerned these cases have certainly not shown any deterioration.

### FAMILIAL STUDIES

None of our 8 cases showed any evidence of pyknolepsy or other forms of epilepsy in the family. However, similar cases in the literature show a fairly high incidence of convulsive disorders in the family and the absence in our series may not be taken as typical of this condition.[2]

### HYPERPNOEA TEST

All 8 of our cases while in the active phase responded to hyperpnoea and the attacks could usually be precipitated after 2 minutes of deep breathing. The three spontaneously recovered cases could have attacks brought on during the active phase but after cessation of the disease this test was of no avail. It was noticed also that in active cases there has been a latent period of several minutes after an attack during which hyperpnoea was not effective. Occasionally it would be impossible to bring on an attack by hyperpnoea but they could always be brought on after a number of attempts were made on several successive days.

### Illness Preceding Onset of Pyknolepsy

In the following table we present details of illnesses occurring in these cases preceding onset of pyknoleptic attacks. We were struck with the high incidence of respiratory infections and wondered if the severe coughing and vomiting associated with the respiratory infections recorded might not have caused some cerebral damage giving rise later to pyknolepsy. We would like to draw attention to our case 8 which came on 2 months after influenza with delirium, case 5, two months after severe whooping cough, case 6 with undiagnosed severe vomiting for one year three years before onset of pyknolepsy and three others with previous severe respiratory infections. One of these latter three had also been cyanotic at birth.

### Electroencephalographic Findings

Using the electroencephalographic apparatus devised by Dr. Myron Schwarzschild of Beth Israel Hospital, single lead recordings were made of all eight cases.[3] Through the courtesy of Dr. Margaret Rheinberger cases 3 and 4 had records of over half an hour's duration made with multilead recordings with the standard 4 channel Grass inkwriter.

1. *Recovered Cases of Pyknolepsy.*— Cases 1, 2 and 3 were studied electrically over two years after spontaneous cessation of their attacks. Cases 1, 2 and 3 showed no abnormal brain potentials in records taken totaling in each case six minutes, nor were any pathological findings brought out by

[2] A search of the literature revealed 39 cases of pyknolepsy that had ceased for two or more years. Using this as a nucleus of study, we found 8 of these cases that showed apparent epilepsy in the family. In 2 cases they were termed "fainting spells" (mother; mother and aunt). In 6 cases there was definite epilepsy (aunt; sister; mother; father and uncle; "a great deal of epilepsy in the family"; uncle). If those termed "fainting spells" may be considered epilepsy, this makes a 20 per cent familial history of epilepsy.

[3] The recording apparatus consists of three separate units. The first unit comprises a switching device for the selection of the desired leads and an arrangement for the measurement of the resistance by means of the determination of the current which flows through the patient for a fixed applied potential. The second unit consists of a balanced amplifier using a twin triode tube arranged so that one triode acts merely as an impedance matching device. The potential variations of one of the leads connected to the grid of this triode are transferred to the cathode. The potential variations of the other lead are directly applied to the grid of the second triode. Thus the plate of the second triode fluctuates in potential in an amount proportional to the total potential difference between the two leads. The time constant of this unit is about 0.15 seconds, and the actual voltage amplification between 10 and 20. The potential variations of the plate of the second triode are applied through a suitable coupling device to the input of a standard electrocardiograph, the "cardiette," of the Sanborn Instrument Company, which constituted the third unit.

Because of the unusual characteristics of the balanced amplifier the apparatus as a whole is relatively insensitive to outside disturbances which change the potential with respect to ground of the patient as a whole. The apparatus is set up in a completely shielded room, although satisfactory recordings have been made with no shielding whatever. The amplifiers used for recording are entirely battery operated.

DETAILS OF ILLNESS PRECEDING ONSET OF PYKNOLEPSY

| | | Age | |
|---|---|---|---|
| *Case 1:* | Vaccination | 1 year | mild |
| | Grippe | 3 years | mild |
| | Stuttering | 3 years on | mild |
| | Chicken pox | 5½ years | mild |
| | Measles | 5½ years | mild |
| | Whooping cough | 5½ years | severe |
| | Absences began | 6½ years | |
| *Case 2:* | Vaccination | 8 months | high temperature |
| | Otitis Media | 8-10 months | |
| | T. & A. | 18 months | |
| | Hay fever | 1-2½ years | |
| | Asthma | 2 years | 3 or 4 attacks |
| | Absences began | 3½ years | |
| *Case 3:* | Premature birth with cord around the neck and cyanosis | | |
| | Bronchitis | early months | frequent, severe |
| | Rickets | 10-16 months | |
| | *Grand mal* | 19 months-3½ years | |
| | Vaccination | 25 months | mild |
| | T. & A. | 3 years | |
| | Absences began | 3½ years | |
| *Case 4:* | Vaccination | early months | mild |
| | Cervical abscesses | 9 months | |
| | Whooping cough | 5 years | severe |
| | Absences began | 5 years | (2 months after whooping cough) |
| *Case 5:* | Rolled off bed | 6 months | mild |
| | Vaccination | 7 months | mild |
| | Toxoid | 8 months | mild |
| | Absences began | 3 years | |
| *Case 6:* | Vaccination | 6 months | |
| | Toxoid | 9 months | |
| | Measles | 4 years | |
| | German measles | 4 years | |
| | T. & A. (ether anesthesia) | 4 years | |
| | Vomiting almost daily | 4½ to 5½ years | |
| | Mumps | 5 years | |
| | Chicken pox | 5 years | |
| | Appendectomy (normal appendix) | 5 years | |
| | Absences began | 8 years | |
| *Case 7:* | Vaccination | 8 months | |
| | Bumped head | 8-9 months | mild |
| | Fell on head | 1 year | not unconscious |
| | Absences began | 2½ years | |
| *Case 8:* | Measles | 15 months | severe |
| | Mumps | 3 years | mild |
| | Diphtheria | 4 years | mild |
| | Whooping cough | 4 years | mild |
| | Influenza and delirium | 8 years | severe |
| | Absences began | 8 years | (2 months after influenza) |

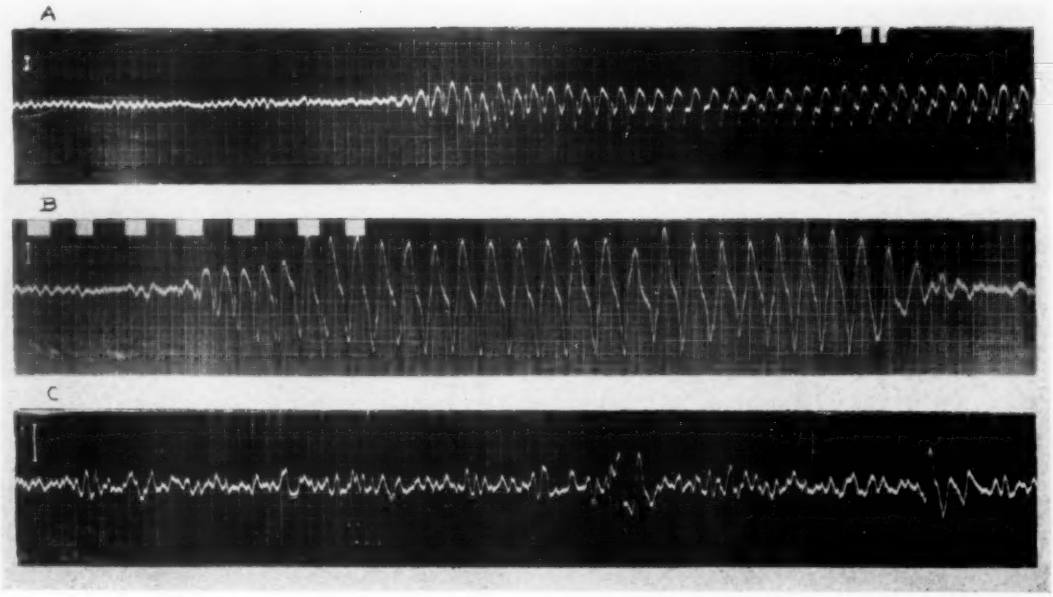


FIG. 1.—A. Case 4. Occipital lead. Beginning of a spontaneous attack. B. Case 5. Occipital lead. Attack induced after 23 seconds of hyperpnoea. C. Case 7. Occipital lead. Scattered slow waves appearing spontaneously 30 seconds after a clinical attack.
Calibration lines 100 mV. Time large intervals 0.2 seconds. All monopolar leads.

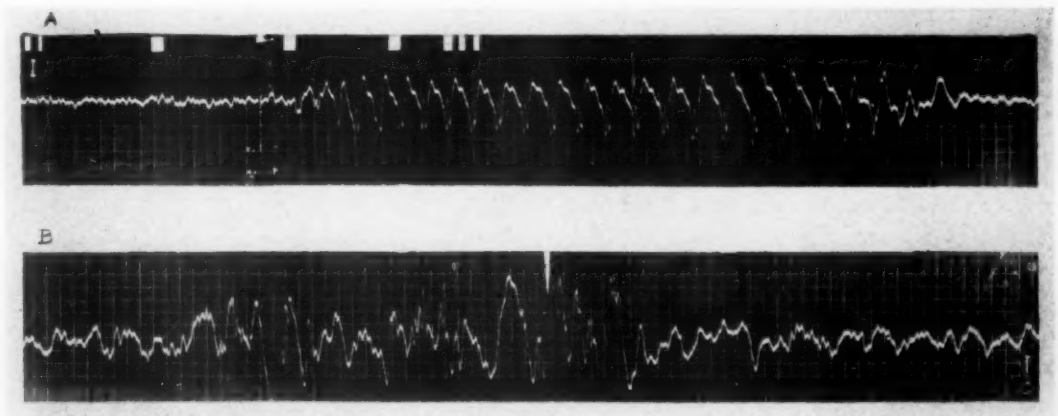


FIG. 2.—A. Case 8. Parietal lead. Attack after 32 seconds of hyperpnoea. B. Case 8. Occipital lead. Apparent attack during sleep. Patient had been sleeping 43 minutes when this discharge occurred. No clinical manifestations observed. Patterns preceding and following showed no similar activities.
Calibration lines 100 mV. Time large intervals 0.2 seconds.

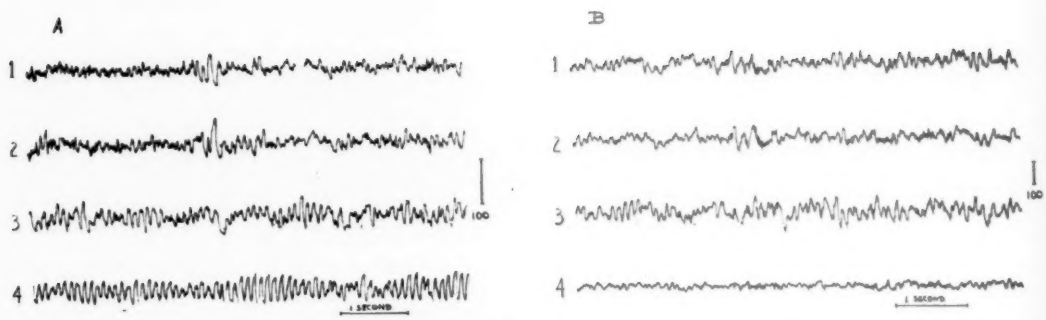


FIG. 3.—Case 4. After clinical recovery. Examples of *maximum* possible abnormalities obtained during 35 minutes recording time, including three periods of hyperventilation of one and a half to two minutes each. A. Spontaneous activity. 1. Left central. 2. Right central. 3. Left occipital. 4. Right occipital. B. Activity 24 seconds after the end of a 2½ minute period of hyperpnoea. 1. Right frontal. 2. Right central. 3. Right occipital. 4. Left mastoid.

Calibration lines 100 mV. Amplifiers equal on individual records.

over-ventilation. In case 3 with a three-channel Grass apparatus and records totalling 30 minutes in duration the records were also normal.

Case 4 (Fig. 1A and Fig. 3) was the only one studied electrically before and after spontaneous cessation of the pyknoleptic attacks. The findings are as follows:

I. The recordings obtained one month before cessation of the clinical attacks taken with the Schwarzschild single lead apparatus showed typical petit mal wave and spike formations, both spontaneous and induced by hyperventilation. Between the attacks there were occasional sub-threshold three per second waves in groups of 1-5 waves without spike formation.

II. Records taken one and a half years after cessation of the attacks using the Grass apparatus for a continuous period of 40 minutes showed no evidence of the 3 per second wave and spike formation so easily demonstrable before recovery from pyknolepsy. There were after recovery however three isolated questionable evidences of pathological waves. The first consisted in an isolated spike with a frequency of 10½ a second which is exactly the frequency of this patient's alpha rhythm. We believe that it might possibly be pathological because of the fact that it occurred in both frontal and both central leads simultaneously and was of greater amplitude (112 m.V) than the alpha rhythm (see illustration). Another possibly pathological wave was found in both central and to a less extent left occipital region with a frequency of 7½ and an amplitude of 112. Hyperpnoea brought out 4 or 5 isolated waves of a frequency of 6-7. We consider this record within the limits of normal. In case 3 there was none of this even questionable abnormal activity in the 30 minute record.

2. *Clinically Active Cases* (Cases 5 through 8. Figs. 1B and C; Fig. 2.)—All of these showed spontaneous abnormal brain potentials both in the form of scattered large slow potentials and in the groups of wave and spike formation described by Gibbs, Davis and Lennox(22) as typical of petit mal epilepsy. Similar activity could be precipitated in each case by hyperpnoea.

Abnormal waves in the clinical attacks showed a variation in frequency from 2.2 to 3.7 a second, with a height varying from 235 to 750 microvolts. The attacks lasted from 3 to 20 seconds. Hyperpnoea precipitated attacks in from 17 to 121 seconds. No clinical attacks were observed without the wave and spike formation. All except one case (case 5) showed good occipital alpha activity with a rhythm between 8.4 and 11 per second, amplitude 25-70 microvolts. No attempt was made at detailed analysis of alpha rhythm from various leads, though in general case 5 showed very poor alpha rhythm in all leads and case 6 showed an unusually high percentage of alpha rhythm in the frontal leads.

Case 8 (Fig. 2) was observed for a period of an hour and a half under fairly deep sleep, in which she did not respond to sounds but showed occasional restless turning. During this period there was no *clinical* evidence of attacks, though she was observed closely. She presented normal sleep pattern with occasional spindles, when there was a sudden isolated outburst of increased electrical activity. These waves are difficult to analyze but would appear to be an attack similar to the threshold attacks seen when she is awake, but with greater irregularity due to the fact that they are superimposed on a sleep pattern. The duration of this electrical outburst was six seconds, a frequent length of her threshold attacks; and an attempt to analyze the waves would make one think there is a similar rhythm and that this was undoubtedly a pyknoleptic attack during sleep.

## Summary and Conclusions

Eight cases of typical pyknolepsy are presented. Four of these ceased spontaneously during the period of observation.

Clinically they were similar to petit mal epilepsy except for the mildness of their symptoms, the fairly monotonous course, their lack of deterioration and the tendency to spontaneous cure.

Electroencephalographic studies were made on three of these cases after they had ceased, four during their still active phase, and one before and after cessation of the attacks. Normal brain potentials were found in the spontaneously recovered cases whereas in

the active ones typical petit mal electrical patterns were observed.

From the study of these eight cases it appears that pyknolepsy is a form of petit mal epilepsy because of:

1. The similarity in the clinical picture;

2. The electroencephalographic pattern in the active phase showing a wave and spike formation found in petit mal epilepsy;

3. The lack of evidence of definite psychogenic factors;

4. The high incidence of epilepsy in families of patients with pyknolepsy as revealed by a study of the literature.

## BIBLIOGRAPHY


1. Fürstner: Zur Pathologie gewisser Krampfanfälle (hysterische Anfälle bei Kindern, Spätepilepsie). Arch. f. Psychiat., **28**: 494-509, 1895-96.

2. Bruns: Ueber Hysterie im Kindesalter. Allg. Ztschr. f. Psychiat., Berlin, **52**: 658-661, 1895-96.

3. Friedmann, M.: Ueber die nicht epileptischen Absencen oder kurzen epileptischen Anfälle. Dtsch. Ztschr. f. Nervenh., Leipzig, **30**: 462-492, 1906.

4. Heilbronner, K.: Ueber gehäufte kleine Anfälle. Deutsch Ztschr. f. Nervenh., Leipzig, **31**: 472-510, 1906.

5. Mann, L.: Ein Fall von ungewöhnlicher Erregbarkeitsveränderung nach Durchtrennung eines peripheren Nerven. Ztschr. f. med. Electrol., Leipzig, **13**: 80-82, 1911.

6. Sedgwick, J. P.: Spasmophilia with especial reference to familiar reactions and repeated absences. Am. J. Dis. Child., Chicago, **7**: 140-148, 1914.

7. Redlich, E.: Zur Narkolepsiefrage. Monatschr. f. Psychiat. u. Neurol., Berlin, **37**: 85-94, 1915.

7a. Lewandowsky, M.: Die Hysterie. Berlin, J. Springer, 1914. Quoted in Handbuch d. Neurol., **5**: 736, 1915.

8. Engelhard, C. F.: Zur Frage der gehäuften kleinen Anfälle. Monatschr. f. Psychiat. u. Neurol. Berlin, **36**: 113-138, 1914.

9. Westphal, K.: Zur Psychogenese und Therapie pyknoleptischer Anfälle. Ztschr. f. d. ges. Neurol. u. Psychiat., **138**: 744-757, 1932.

10. Sauer, H.: Ueber gehäufte kleine Anfälle bei Kindern (Pyknolepsie). Monatschr. f. Psychiat. u. Neurol., **40**: 276-300, 1916.

11. Schroeder, F.: Die Bedeutung kleiner Anfälle (Absenzen, petit mal) bei Kindern und Jugendlichen. Med. Klinik, **13**: 467-470, 1917.

12. Bolton, G. C.: Die Pathogenese der gehäuften kleinen Anfälle. Monatschr. f. Psych. u. Neurol., **39**: 134-167, 1916.

13. Sachs, B., and Hausman, L.: Nervous and mental disorders from birth through adolescence. New York, Paul Hoeber, 608, 1929.

14. Jelliffe, S. E., and Notkin, J.: Pyknolepsies. Am. J. Psychiat., **91**: 679-692, November, 1934.

15. Ratner, J.: Zur Kenntnis der Pyknolepsie und ihrer Grenzzustände. Arch. f. Psychiat., **89**: 802-813, 1930.

16. Stier, E.: Klinische Stellung u. Prognose d. gehaufte kleine Anfälle. Ztschr. f. d. ges. Neurol. u. Psychiat., **60**: 143-189, 1923.

17. Polisch, K.: Zur Frage der Pyknolepsie. Arch. f. Psychiat., **67**: 424-453, 1922.

18. Baudoin, A., and Schaeffer, H.: L'épreuve de l'hyperpnée. Rev. Neurol., **1**: 445-473, April, 1933.

19. Moeller, U.: Differentialdiagnostische Abgrenzung der Kindlichen Epilepsie gegen Pyknolepsie und Salaamkrämpfe. Jahrbuch f. Kinderheilk., **146**: 240-252, 1936.

20. Rosenthal, C.: Die kleinen gehäuften Anfälle des Kindesalters. Ergebn. d. Inn. Med. u. Kinderh., **48**: 77-124, 1935.

21. Golla, F., Graham, S., and Walter, W.: Electroencephalogram in epilepsy. J. M. Sci., **83**: 137-155, March, 1937.

22. Gibbs, F. A., Davis, H., and Lennox, W. G.: The electroencephalogram in epilepsy and conditions of impaired consciousness. Arch. Neurol. & Psychiat., **34**: 1133-1148, December, 1935.

23. Owen, J., and Berlinrood, L.: Pyknolepsy: A study of diagnosis and prognosis. The Journal of Pediatrics, Vol. 19, No. 6, pages 762-777, December, 1941.

# ALCOHOL ABSORPTION AND INTOXICATION

## Their Modification by Autonomic Drugs [1]

By MAX RINKEL, M. D., and ABRAHAM MYERSON, M. D., Boston, Mass.

The relationship of autonomic drugs to alcohol absorption and intoxication is of clinical, medicolegal and theoretic interest.

Bloomberg introduced amphetamine (benzedrine) sulfate in the treatment of chronic alcoholism. Reifenstein and Davidoff observed clinically a favorable effect of this drug on acute alcoholic intoxication. Experimentally, however, no attempts have been made, with the exception of the work of Fleming and Reynolds, to investigate the pharmaco-physiological effects of these drugs with regard to alcoholism. Continuing our researches on the pharmacology of the human autonomic nervous system, we investigated, therefore, the effect of both sympathomimetic and parasympathomimetic substances on alcohol absorption and intoxication in man and pigeons, the results of which we shall briefly present. (We use the terms sympathomimetic and parasympathomimetic knowing well the inexactness of these words.)

### I. The Effect of Sympathomimetic Substances on Alcohol Absorption and Intoxication

In this study we included the following drugs: amphetamine (benzedrine) sulfate, paredrine, epinephrine and atropine sulfate which, by abolishing the acetylcholine effect, functionally belongs in this group.

When amphetamine sulfate is given intravenously one minute after the oral administration of alcohol, which we gave in amounts ranging from 0.5 to 0.7 g. per kilo body weight, the resulting blood-alcohol curve shows a definite inhibition as compared to the control curve, the inhibition being greatest at the 30-minute interval, and then gradually diminishing. This effect was consistently obtained in 17 experiments, regardless whether amphetamine was administered intravenously or orally, and the quantitative correlation related directly and exclusively to the amount of amphetamine given.

A similar effect was produced by the administration of paredrine, adrenalin and atropine, the difference being only in the degree of inhibition. Thus, if clinically equivalent amounts of these adrenergic substances were given, it became apparent that amphetamine was the most effective drug in depressing the blood-alcohol concentration, while paredrine came second in effectiveness and adrenalin third. Atropine seemed to be the least effective of the four.

The question arose whether there was a fundamental difference in the action of these substances. A number of experiments seemed to affirm this. In experiments in which paredrine raised the systolic blood pressure to a level considerably higher than did amphetamine sulfate, the blood-alcohol concentration was depressed much more by the latter drug. Amphetamine also had a much more prolonged effect. This was particularly apparent when it was injected in gelatine, a vehicle which delays its absorption, by intramuscular route. Thus, even 72 hours after the injection of the amphetamine-gelatine mixture, the alcohol uptake into the blood stream was still delayed.

In explaining the inhibitory effect of this group of adrenergic drugs on the blood-alcohol concentration, we have to take into consideration that the main factors which account for the concentration of alcohol in the blood are absorption, diffusion into the tissues, oxidation in the tissues (particularly in the liver), and excretion through the lungs and through the kidneys.

Since we can definitely rule out as causative factors in depressing the blood-alcohol curve excretion, oxidation and diffusion of alcohol into the tissues, it appears certain

[1] Read at the ninety-seventh annual meeting of The American Psychiatric Association, Richmond, Virginia, May 5-9, 1941.

From the division of psychiatric research, Boston State Hospital, Boston, Mass.

A more complete paper with references, charts and a detailed account of the experiments is in process of preparation.

that altered absorption must account for the result obtained. This conclusion is confirmed by the following: (1) the shape of the blood-alcohol curve which shows a gradually ascending slope in which the peak has been shifted to the right as compared to the control curve; (2) the depression of the blood-alcohol curve which is equally present in both the arterial and venous blood; (3) the injection of benzedrine at the height of alcohol absorption which does not depress the blood-alcohol curve; (4) if alcohol is introduced intravenously, thus avoiding absorption, neither benzedrine nor adrenalin, as Fleming and Reynolds show, alter the blood-alcohol curve.

The question whether a delay of the emptying time of the stomach may be a factor in producing the depressed alcohol curves can be answered by experiments in which we introduced the alcohol directly into the duodenum under fluoroscopic control. Even under these experimental conditions, considerable delay in the absorption of alcohol was observed.

The final proof for the delayed absorption of alcohol under the influence of adrenergic substances was the clinical observation made of the effect of amphetamine sulfate on the intoxication of pigeons. Pigeons are ideal subjects for the study of alcoholism. They are easily intoxicated, and with appropriate doses of alcohol show a dramatic effect in both acute and chronic intoxication, assuming quite often in the latter a posture which we call "penguin position" because of its similarity to the erect posture of a penguin.

Two pigeons, A and B, of about the same weight, received the same dose of alcohol, pigeon A receiving in addition an injection of amphetamine sulfate. Twenty-five minutes following this treatment, pigeon B was completely intoxicated, while pigeon A showed no signs of intoxication. However, four hours later the reverse took place: pigeon A became intoxicated, while pigeon B recovered. This, we believe, is an additional proof that adrenergic substances delay or inhibit the absorption of alcohol from the alimentary tract.

## II. The Effect of Parasympathomimetic Drugs on Alcohol Absorption and Intoxication

Naturally the question arose, what influence do parasympathomimetic drugs have on alcohol absorption and intoxication? It was anticipated that these drugs have an enhancing effect on absorption. It was found, however, when we started our investigations, that when alcohol was given orally, none of the drugs which we included in this study, namely acetylcholine, acetyl-beta-methylcholine (mecholyl), carbaminoylcholine (doryl), and prostigmine showed an enhanced absorptive effect; on the contrary, in most of the experiments we obtained a delay in absorption.

It seemed reasonable to explain this as due to a delayed emptying of the stomach because of a resulting pylorospasm, which Myerson and co-workers had previously described as following the injection of these drugs.

Therefore, by duodenal tube we introduced the alcohol directly into the duodenum and now obtained enhanced absorption with the more stable acetylcholine derivatives—mecholyl and doryl.

Acetylcholine proved unsuitable for this type of experiment because of its rapid destruction by the tissue cholinesterase. However, since we had other experimental evidence of the effectiveness of acetylcholine if it was applied directly to the intestines, we changed our procedure by administering this drug and alcohol per rectum. Our experiments show that alcohol is readily absorbed from the colon; that this absorptive effect is enhanced when from one to two minutes previous to the administration of alcohol, acetylcholine is given rectally and especially if an intramuscular injection of prostigmin for the protection of acetylcholine is administered 15 minutes before the experiment is started. On the other hand, previous atropinization of the patient prevents the effect of acetylcholine, and the resulting alcohol curve is practically identical with the control.

The question arose whether the enhanced absorption was due to vasodilatation of the intestinal vessels. We repeated, therefore,

the experiments with such vasodilators as histamine and nicotinic acid. The results, on the whole, were negative.

In summarizing the results of our investigation, we may state the following:

1. Sympathomimetic substances delay absorption of alcohol from the alimentary tract and postpone intoxication.

2. Parasympathomimetic substances tend to enhance absorption of alcohol from the alimentary tract.

3. The use of these drugs therefore, especially benzedrine sulfate, cannot be unreservedly recommended in the treatment of acute alcoholism, more especially while the patient continues to drink. Moreover, the use of benzedrine by automobile drivers for the purpose of preventing drunkenness is dangerous, since the intoxicating effect of the previously imbibed alcohol is not dispelled but delayed.

4. The above does not apply to the great value of amphetamine sulfate in the treatment of chronic alcoholism.

# GALILEO AND FREUD[1]

By FOSTER KENNEDY, M.D., F.R.S.E., New York, N. Y.

We are here tonight to learn from one of its great authorities the details of an intellectual movement set on foot to travel far and wide by one of the masters of science. Advances in knowledge come often, not by the addition of new facts, but by a novel re-arrangement of material that has long been known: a re-arrangement giving entirely new direction through a mental jump which places old knowledge on a new and more manageable and more illuminated level. The masters have all done this lifting: Copernicus, Galileo, Newton, Darwin, Gall, Freud, Einstein and Dirac: they have made patterns and order where there seemed to be disorder without aim, and when those men had discovered the design, whether in the cosmos, in nature fixed and nature living, or in Man —the organized whole was found to be greater than, and more variable than the sum of its parts. It is the poetic and scientific faculty of imagination by which a genius can coordinate and lift the sum of known knowledge, and the poet acts by warning the scientist against mistaking his discovery of a regulating natural law for a revelation of the Universe itself.

In this "annus terrible" 1942, we celebrate the three hundredth anniversary of the death of one of the great men whose names I have just said. Galileo heard of a Dutch spectacle maker who had discovered a method of lessening visual distance by means of a convex lens and a concave lens together. Fired by this idea he independently made his first telescope. This man was trained first to be a doctor, but his genius for mathematics, combined with his gift of close observation, made him choose instead the Universe for his garden.

Out of the ranks of our profession have come geniuses in many different fields. The humanist in literature, like Montaigne, the poet like young Keats, and in Galileo, the genius who first saw the satellites of Jupiter, the rings of Saturn, the markings on the face of the sun, the starry nature of the Milky Way, and who taught his students how to "measure" the mountains of the moon by their own shadows. It is a curious parallel that Freud should teach us to measure the validity of man by the shadows of his dreams.

Perhaps the parallel is only one of analogous ideas, for Galileo in philosophy was the observer, the objectivist, while Freud's thought stems from the subjectivism of Kant, Fichte, Hegel and Nietsche, though Nietsche was perhaps more rhapsodist than thinker. The objectivism of Galileo led him by his observations to the idea that proved the truth of Copernicus' revolutionary theory which dethroned man from his adopted seat in the middle of the Universe. For this denial of a homocentric Universe, Galileo found himself under the ban of the Inquisition. Subjectivist dogmas had to be upheld in order to maintain Ecclesiastical authority.

It might interest you to hear a sentence of Milton's in this regard:

"I could recount what I have seen and heard in other countries than England, where this kind of Inquisition tyrannizes; when I have sat among other learned men and was counted happy to be born in such a place of philosophical freedom as they thought England was, while they themselves did nothing but bemoan the servile condition into which learning among them was brought; for this it was which had damped the glory of Italian wits; that nothing had been there written now these many years but flattery and fustian. There it was that I found and visited the famous Galileo grown old, a prisoner to the Inquisition, for thinking in astronomy otherwise than the Franciscan and Dominican licensers thought. I took it as a pledge of future happiness in England, that other nations were so persuaded of her liberty." His persecutions forced apostasy of utterance upon this old man, but he murmured below his breath, "All the same it does move."

I have said these few words on our fellow-

[1] An introduction to Dr. A. A. Brill's paper "The Freudian Epoch" delivered at the Academy of Medicine, New York City, January 22, 1942.

physician of three centuries past to bring to your attention the exhibit put up here in this Academy of Galileo's thought and works. It is curious to think that the mathematics of the pendulum movement worked out by this man should have been basically needed by Clerke-Maxwell and Hertz in their discovery of radio activity fundamental to our own time.

I mentioned Gall as among the Masters, for though not recognized as such throughout most of the scientific world, he had a great idea. In Gall's "Anatomical and Physiological Inquiries Respecting the Brain and Nerves," he demonstrated the great theory that function was localized in the brain. This notion became embalmed in the false assumptions and dogma of phrenologists in the first two-thirds of the 19th century, who were all that time powerful on every faculty of medicine. But they acted as the preserver and the vehicle of Gall's great idea to men like Hitzig, Hughlings Jackson, Ferrier and Munk, who stimulated by the speculative imagination and coordinating thought of Gall proved and expanded Gall's theories as Galileo had proven and expanded the theories of Copernicus. Thereby was laid the foundation of the physiology of the nervous system as we are getting to know it today.

We must forever be on the lookout that subsidiary dogmas do not asphyxiate the central idea, and many of us feel that modern psychology, despite strong grasp and vigorous reach, tends to regard man overmuch as an entity somewhat isolated from the Universe and the forces which made him and are around him—an entity over-simplified and stereotyped. We must guard against our thoughts becoming over-simplified and dogmatic. For Freud has passed to us a very great idea, the phylogenetic development of behavior and personality: Each individual, as he grows from the embryo to the adult, is a little cycle of the race. We have long known that from the egg to death, we pass through stages in our body at least similar to those through which humanity has passed before. Freud has now made it clear that in our emotions, in our urgings, in the preponderance of this instinct over that at different periods of our lives, we have a like evolution and, if we live into senility, devolution of personality. He has shown the child as indeed no angel, but rather, at the age of five a polytheistic savage, having for his authority, and too, his private pleasure, a genius loci in every tree and star; and at ten, he's a kind of Nazi, naturally characterized by restricted imagination, hypertrophied tribal emotions, and truculence towards other tribes; he is, like them, regimented in ritual, thoroughly intolerant, and, to offset his annoying sense of inadequacy, brutally contemptuous towards all those weaker than himself. Freud has insisted that the child's sexual instincts emerge by gradual progression from an emotional preoccupation with one orifice of its body to an emotional preoccupation with another. However, Freud himself has doubted the therapeutic value of this contribution of our knowledge of ourselves. But at least his teaching makes it clear how our instincts have developed within the microcosm of each man's body, and—if inherited endowment be lacking with which to attain maturity—how a man or masses of men may stick at the different instinctual levels. However, as regards some of Freud's other conclusions, I feel that while, bodily, we have still vestigial remnants of our past like gill-slits, and emotionally, others like sexual reversions, it is unwise to attempt to estimate the total adult body in terms of gill-slits, or the total adult personality in terms of an uncovered sexual reversion.

By his writing Freud liberated us from the tyranny of Puritanical dogma and bade us, as the Voice bade St. Peter on the rooftop in the cool of the evening, "to call nothing that I have created common or unclean."

It is strange how centuries of thinking had to be done before the obvious implications of the discoveries of Copernicus and Galileo were applied to our own relationship with the world lying apparently about us and outside ourselves. The homocentric Universe was no longer possible. The stream of subjectivism in German philosophy resisted the social demotion of man in relationship to the Universe. Freud's teachings tend to demote him in relation to himself. The Categorical Imperative of Kant was a Puritanical moral conscience; the Categorical Imperative of Freud emphasizes primitive characteristics as fatalistically defeating the conscious self.

We have learned, largely through the teachings of Freud, that the pressure of sex impinges on and moulds, modifies and directs the organism and its personality expression. One must add also the pressure of hunger, the pressure of the herd and the pressure of the instinct of self-preservation.

And this great contribution to our sociological and anthropological thinking has been made known to us and made available for us by the teaching of one of Freud's greatest disciples—and perhaps I say "disciple" advisedly, for Freud's teachings run some risk, through the opposition they excite, of becoming a religion rather than a branch of knowledge—Dr. Brill.

# CORRESPONDENCE

*Editor,* THE AMERICAN JOURNAL OF PSYCHIATRY.

SIR: The following statement appeared as a footnote in the article entitled "Alcoholism, Neurosyphilis, Shock Therapy and Geriatrics," under 1941 Review of Psychiatric Progress, Vol. 98: 591, January, 1942:

"Curare, erythroidine or similar substances should not be used with electroshock for the prevention of fractures as the degree of respiratory failure is much greater than when metrazol shock is used." Such a statement is inaccurate and will be responsible for unnecessary traumatic fracture complications to patients. The authors either have had little experience with curare-electroshock therapy or are unaware of the pharmacology of curare action. Curare has no other action than a peripheral neuromuscular block. There is no central action whatever. Therefore, no increased respiratory embarrassment could occur, only peripheral respiratory muscle paresis from overdosage and prostigmin is a speedy, specific antidote.

Hundreds of combined curare-electroshock treatments are being given weekly throughout the United States and Canada without difficulty. In our clinic we have given over 1500 such treatments. It has been routine practice since replacing metrazol by electroshock. No clinical evidence of prolonged respiratory embarrassment has ever been seen. Curare in no way enhances the hazard of electroshock convulsive therapy. There will appear shortly, a paper from our clinic demonstrating that traumatic incidence from straight electroshock is an important complication; not only skeletal but visceral and preliminary curarization is not only safe but eliminates all complications and enlarges the scope of usefulness of the therapy.

In this same theme the following statement in the above mentioned article should have been deleted because of inaccuracy, "The best preventives for the typical compression fracture of the dorsal spine are hyperextension and minimal restraint." No method of mechanical restraint can prevent all fractures of spine or extremities. The fundamental problem is the severity of the convulsion which can only be relieved by softening the seizure through the principle of curarization.

On page 534 of this same issue, authors H. J. Worthing and L. B. Kalinowsky admit they have not used curare but state incorrectly that it causes respiratory embarrassment. They felt they did not dare add to central electric effect of depressed respiration, a peripheral impairment of respiratory muscles by means of curare.

Because of the importance of this problem in shock therapy in order that the curare modification may be fairly presented, I trust that you will see fit to publish in the JOURNAL this answer to these criticisms.

Very sincerely yours,
A. E. BENNETT, M. D.,
607 Medical Arts Bldg.,
Omaha, Nebraska.

---

## *Curare Versus Hyperextension in Convulsive Treatment*

*Editor,* AMERICAN JOURNAL OF PSYCHIATRY

SIR:

We shall look forward to the publication of Bennett's experiences with curare in electroshock therapy, and do indeed hope that they will serve to establish a method of eliminating the complications of electroshock therapy. Our own experience with it has been less happy, and after repeatedly witnessing some very alarmingly prolonged periods of apnea we decided to leave further experimentation with curarized electroshock treatments to the more expert or valiant. Pending newer developments, psychiatrists must however rely on their own critical judgment of the available literature. Fortunately most of the important facts have already been well summarized in Bennett's own papers. A few pertinent excerpts may be cited: With reference to the toxic action of curare he stated—"Death occurs from

asphyxia due to respiratory paralysis." (page 1046, AMERICAN JOURNAL OF PSYCHIATRY, 97: 1040-60, March, 1941.) In describing the physiological sequence of symptoms (*ibid.*, page 1046) he said—"Last, appears shallowness of respiration from weakness of the intercostal and the diaphragm." After describing the measures that may be used to combat respiratory depression he also noted the important fact that metrazol, the convulsant agent he had at first employed, acted as a central physiological antagonist to the peripheral respiratory depression of curare. "Metrazol," he stated (page 1048), "seems to be at least partially antidotal in its action."

Electroshock, unfortunately, cannot be said to be antidotal to the respiratory depression induced by curare. Quite the contrary; for the grand mal induced by faradic stimulation is not infrequently preceded by prolonged apnea, and a petit mal is especially apt to be associated with a marked and prolonged cessation of respiration. In spite of the extraordinary capacity of the heart to beat on long after the cessation of respiration, this clinical picture is often distressing, and I hesitate to aggravate it further with a peripheral respiratory depressant. Bennett has reported one fatality (*Psychiatric Quarterly*, April, 1941) following the use of the curare-like synthetic drug quinine methochloride. I know of at least one other fatality from beta-erythroidine. The results with hyperextension, on the other hand, seem quite good. Worthing and Kalinowsky report 60 cases treated with hyperextension without the development of compression fractures. Rankin reported a similar series of 18 cases (*Archives of Neurology and Psychiatry*, 44: 362-376, Aug. 1940) given convulsive treatment under hyperextension, with no compression fractures. Here, too, I have been less fortunate in my own series of cases, but the fractures are generally almost asymptomatic, while the convenience to the doctor and the convenience and casualness to the patients mean a good deal in the smooth management of treatment and in reassurance to apprehensive patients.

For the present I am continuing with hyperextension, and I would prefer to save curarization for very special indications.

Very truly yours,

JOSEPH WORTIS, M. D.,
Bellevue Psychiatric Hospital
and New York University
College of Medicine

# COMMENT

## THE U. S. INSTITUTIONAL CENSUS FOR 1943

The JOURNAL regrets to inform its readers that the appropriation for the collection of annual statistics on mental institutions is seriously threatened. Indeed, unless prompt and vigorous action is taken, an irreparable gap in the series of figures may result.

For one hundred years, the decennial census has included information regarding patients in mental hospitals and institutions for the mentally defective and epileptic. In 1927 an annual enumeration was made, and has been carried on since. The booklets containing the results of these studies have been familiar to mental hospital administrators and to innumerable students of psychiatric and social problems. They have proven their value repeatedly in indicating trends of mental disease in general and of specific psychoses, and in enabling legislatures and state planning boards to make places for the future needs of institutions.

We are now at war. The experience of this country during and after World War I demonstrates that changes in rate curves may be expected in the field of mental disorder, and this likelihood is greatly increased by the increasing participation of the civilian population in total war. Here is a field which accounts for a half million hospital beds and over 100,000 annual admissions; the present cost of actual maintenance, apart from capital outlays or from the loss in earning power represented by the illness of those patients, far exceeds one hundred million dollars annually. The operation of mental hospitals, in short, is big business—furthermore, it is public business, and the compilation of statistics regarding its intake, processing and output are as essential to a proper functioning and planning as are similar statistics in a large business corporation.

The Bureau of the Census has estimated the cost of its institutional census for 1943 at slightly over $53,000. This item was completely eliminated by the Bureau of the Budget from the figures presented to the Appropriations Committee. Unless the Subcommittee can be induced to restore the item or at least enough to permit the collection of the basic data, an irreparable gap in these important compilations will occur at a crucial time.

The JOURNAL appeals to the Honorable Louis C. Rabaut, Chairman, and his colleagues of the Subcommittee of the House Appropriations Committee, and to Senator Pat McCarran, Chairman of the Senate Subcommittee on Appropriations, to use their good offices to prevent the serious and far-reaching error which the omission of this appropriation would constitute.

## EMBLEM OF THE AMERICAN PSYCHIATRIC ASSOCIATION

To signalize the hundredth anniversary of the Association in 1944 and the publication of the centenary volume on the history of American psychiatry, it has been decided to adopt a special device appropriate to the occasion and which shall serve as a permanent emblem of The American Psychiatric Association.

To this end the president, Dr. J. K. Hall, has announced a competition for a suitable design, and the organization of the competition has been entrusted to the Committee on the History of Psychiatry under the chairmanship of Dr. Gregory Zilboorg. This committee in cooperation with the Committee on Public Education of which Dr. C. C. Burlingame is chairman has announced that the sum of five hundred dollars is available for the distribution of awards.

The Association is fortunate in having been able to secure the services, as a jury of selection, of three distinguished artists: Eric Gugler, architect; Leon Kroll, painter; Paul Manship, sculptor. The contest is open

to all artists, art teachers and students, and the announcement has been posted in museums and art schools throughout the country. From the drawings submitted the jury of selection will choose the three best, and for each of these a prize of one hundred dollars will be awarded. The Council of the Association in consultation with the jury of selection will then choose from the three prize winning designs the one deemed most appropriate to typify the achievements and objectives of organized American psychiatry. For the drawing so selected an additional award of two hundred dollars will be made. This design will become the official emblem of The American Psychiatric Association.

For preliminary orientation of the contestants a statement has been prepared, outlining in brief the origins and growth of the Association and its place and meaning in the medical and social history of the United States and Canada. With complete freedom for the exercise of their creative imagination the artists are invited to translate some significant aspect of this broad concept of a century's progress into the symbolism which is their means of communication. It is a challenging task whose results will be awaited with lively interest and anticipated gratification.

# NEWS AND NOTES

REPORT OF THE NOMINATING COMMITTEE.—I wish to submit the following report of the Nominating Committee:

For President: Arthur H. Ruggles, M. D., Providence, R. I.

For President-Elect: Edward A. Strecker, M. D., Philadelphia, Pa.

For Secretary-Treasurer: Winfred Overholser, M. D., Washington, D. C.

For Councillors for three years: Douglas Thom, M. D., Boston, Mass.; Titus Harris, M. D., Galveston, Tex.; James K. Hall, M. D., Richmond, Va.; and Walter Treadway, M. D., San Francisco, Calif.

For Auditor for three years: Charles W. Castner, M. D., Austin, Tex.

Respectfully submitted,
R. FINLEY GAYLE, JR., M. D.,
*Chairman,*
CLIFFORD MACK, M. D.,
HENRY W. WOLTMAN, M. D.,
ROY D. HALLORAN, M. D.,
JOHN R. ROSS, M. D.

---

HOTEL RATES FOR THE BOSTON MEETING.—Notice has been received at the New York office of the Association from the Boston Chamber of Commerce and the Statler Hotel that there will be an increase in room rates of 10 per cent effective February 1, 1942, at the Statler and all hotels. Those who made reservations before February 1 will be honored at the old rates, but reservations requested after February 1 will be booked at the increased rates.

---

GERONTOLOGY.—Dr. Nathien W. Shock was recently appointed psychophysiologist to carry on certain physiological work on gerontology in the division of chemotherapy of the National Institute of Health, United States Public Health Service. The work of the Unit was started in May 1940, through a grant from the Josiah Macy, Jr., Foundation and by cooperation with the United States Public Health Service. Dr. Edward J. Stieglitz, formerly associate clinical professor of medicine at Rush Medical College, was selected as director. The Macy grant expired in July 1941, but the work is being continued in a reorganized Unit, to which Dr. Shock has been assigned and in which Dr. Stieglitz is acting as consultant.

In connection with the activities of this Unit, and in recognition of the importance that aging has on mental health, a conference on mental health in later maturity was held in Washington in May 1941. This conference was attended by psychiatrists, psychologists, neurologists and laboratory workers who had made contributions in the field of mental health. The proceedings of the conference will be published as a Supplement to the Public Health Reports.

---

EDUCATION.—The following paragraphs are from the annual report of Dr. Isaiah Bowman, president of the Johns Hopkins University:

> We have a sound pioneer tradition in education whose hall-mark is democratic *experiment*. Whatever we may have borrowed from Europe in ideas, materials and techniques, we can trace definite lines of experimentation directed down the years toward our own conditions. The first of these conditions is that education must be adapted to a democratic way of life. Our educational system did not become inclusive by accident. It did not expand by accident. It was an indispensable part of the avowed design of America in the colonial period and still more emphatically at the beginning of our national life. The bulwark of democracy was to be an educated electorate. We are absolutely committed to that course. . . . .
>
> It is the crowning distinction of the American university that it has built a worthy part of the national temple. While there may be confusion in confused minds concerning university purpose, could anything be clearer than that free inquiry and report is itself one of the greatest and most highly moral educational purposes in a democracy? The university is not designed to be authoritarian and say the last word in morals, ideas, research or teaching. We can avoid the authoritarian road only by choosing the free road. A body of prescribed doctrine, approved books, dialectical smartness and *a priori* opinion masquerading as "wisdom" can give "unity" also, as authoritarian governments have amply demonstrated. The strength of our American unity is in our free way of uniting. Our purpose is to train that freedom into responsibility.

RUSSIAN MEDICAL WAR RELIEF.—The Greater New York Physicians Committee for Russian Medical War Relief held a dinner meeting February 13, 1942, at the Waldorf-Astoria Hotel in New York City, under the chairmanship of Dr. Tracy J. Putnam. Officers of the committee, organized recently to further the campaign by Russian War Relief, Inc., for medical and surgical supplies for Russia, are Dr. Putnam, chairman; Dr. Eugene H. Pool, co-chairman; Dr. S. Bernard Wortis, vice-chairman; Dr. Iago Gladston, treasurer; and Dr. Eric M. Matsner, secretary.

The Soviet Central Medical Library has let it be known that medical books are urgently needed, particularly American works on neurosurgery, a topic on which the United States can furnish the most modern information. The Russian government has issued a list of the books most desired and would be glad to exchange important Soviet literature on medicine for some of these volumes. The book list or other information can be obtained from the New York Agency of the Soviet Central Medical Library at 535 Fifth Avenue.

---

CIVILIAN MORALE IN WAR TIME.—A series of training schedules for the instruction of Civilian Defense Workers in the basic facts concerning the behavior of people under stress has been drawn up by the Military Mobilization Committee of The American Psychiatric Association. Schedules dealing with Morale, Fatigue and with Anxiety are available. Copies may be obtained without cost from Dr. D. Ewen Cameron, Albany Hospital, Albany, N. Y.

---

NEED OF PSYCHIATRISTS IN THE BRITISH ARMY.—In a letter from Col. J. R. Rees to Dr. Wm. L. Russell, Col. Rees, who is consulting psychiatrist to the British Army, writes:

> I have had to start the psychiatric service from scratch and though there have been a great many disappointments and obstructions, as you might well imagine, the team of about 140 psychiatrists that we have now in the Army is doing very well and making a really valuable contribution in all sorts of ways.
>
> A great deal of our work has, of course, been retrograde recruiting, and there we have done only a fraction of what should be done. We have just succeeded in getting a service of selection of personnel instituted and are busy with personality tests for selecting officers, and a dozen other projects. It really seems as though psychiatry in the Army had to be divided into three groups: (1) Clinical psychiatry. (2) Social psychiatry (questions of morale, crime, relationships with most of the other departments of the Army, etc.). (3) Industrial psychiatry (selection problems and dealing with the misfits).
>
> We are very near the end of our competent psychiatrists, or at least it is very hard to get more of them released from their civilian jobs, so that it looks as though for the future we shall have to use doctors who are not psychiatrists but who have an interest for the second and third types of work, giving them as much training as possible under present conditions. Only last night I was discussing the question of whether it would be possible to get a group of psychiatrists over from the States to help us. It would be very good if we could do that.

Col. Rees' London address is 3 Devonshire Place, London, W. 1, England.

---

THE LANGLEY PORTER CLINIC.—The new Langley Porter Clinic, a 100 bed psychiatric hospital maintained by the California State Department of Institutions in connection with the University of California Medical School and the University of California Hospital at San Francisco, California, will open on July 1, 1942.

This hospital will have an 18 bed neurosurgical ward, a 16 bed children's ward, and a series of regular psychiatric wards, an outpatient department, an operating room, x-ray laboratory, general clinical and research laboratories including a special electroencephalography laboratory. The University of California Medical School will be in charge of all teaching and research work.

Twelve residencies are available, appointments being for one year. Those appointments coming under the State Department of Institutions carry an allowance of $50 a month plus maintenance for self and family. The maintenance allowance is $60 a month if single, $90 if married, with $5 for each child under 5 and $15 for each minor child over 5. Applicants must be graduates of an approved medical school within the last 5 years, and have had at least one year's internship. Appointments are open to both men and women.

Applications should be addressed to Dr. Karl M. Bowman, Medical Superintendent, Langley Porter Clinic, The Medical Center, San Francisco, California.

---

RORSCHACH COURSE AT MICHAEL REESE HOSPITAL.—S. J. Beck, Ph. D., head of the psychology laboratory, Michael Reese Hospital, will offer his summer course in the Rorschach test in personality study and clinical diagnosis, June 22-26, 1942.

The course teaches the technique of administering the Rorschach test and scoring the responses. It orients the student into interpretation with especial emphasis on clinical classification. Response records as obtained from various healthy personality groups and from clinical groups will be presented in full, analyzed and interpreted. The accent this year will be on the neuroses.

The course will be in session in two two-hour periods daily for five days. Interested persons are invited to communicate with the Medical Librarian, Michael Reese Hospital, 2908 Ellis Avenue, Chicago, Illinois.

---

DEATH OF DR. GEORGE P. SPRAGUE.—With regret we record the passing on January 18, 1942, of Dr. George P. Sprague, superintendent and owner of High Oaks Sanatorium for Mental and Nervous Diseases in Lexington, Kentucky.

Born in Philadelphia in 1863, and a graduate of Jefferson Medical College, Dr. Sprague devoted his life work to psychiatry. For some years he was on the staff of the Danvers State Hospital in Massachusetts, where he was associated with Dr. Charles W. Page. Two or three years ago he had served as president of the Southern Psychiatric Association. He had conducted the High Oaks Sanatorium for 42 years, when in August 1941 he sold the institution to his son, Dr. George S. Sprague, and retired from active duty.

---

CONSERVATION OF SCHOLARLY JOURNALS.—The American Library Association created this last year the Committee on Aid to Libraries in War Areas, headed by John R. Russell, the Librarian of the University of Rochester. The Committee is faced with numerous serious problems and hopes that American scholars and scientists will be of considerable aid in the solution of one of these problems.

One of the most difficult tasks in library reconstruction after the first World War was that of completing foreign institutional sets of American scholarly, scientific and technical periodicals. The attempt to avoid a duplication of that situation is now the concern of the Committee.

Many sets of journals will be broken by the financial inability of the institutions to renew subscriptions. As far as possible they will be completed from a stock of periodicals being purchased by the Committee. Many more will have been broken through mail difficulties and loss of shipments, while still other sets will have disappeared in the destruction of libraries. The size of the eventual demand is impossible to estimate, but requests received by the Committee already give evidence that it will be enormous.

With an imminent paper shortage attempts are being made to collect old periodicals for pulp. Fearing this possible reduction in the already limited supply of scholarly and scientific journals, the Committee hopes to enlist the cooperation of subscribers to this journal in preventing the sacrifice of this type of material to the pulp demand. If you have copies of The American Journal of Psychiatry which you do not intend to preserve in your own library, or if you would like any further information concerning this vital scientific project as outlined above, and how you may assist therein, please write to Wayne M. Hartwell, Executive Assistant to the Committee on Aid to Libraries in War Areas, Rush Rhees Library, University of Rochester, Rochester, New York.

---

PENNSYLVANIA PSYCHIATRIC SOCIETY.—The Pennsylvania Psychiatric Society held its third regular mid-year meeting at the Harrisburger Hotel, Harrisburg, Pennsylvania, Tuesday February 10, 1942. Winfred Overholser, M. D., superintendent of Saint Elizabeths Hospital, Washington, D. C., and secretary-treasurer of the American Psychiatric Association, spoke on "Some Pos-

sible Contributions of Psychiatry to the National Defense." His paper was discussed by Colonel J. W. Grissinger, M. D., of Harrisburg, Samuel W. Hamilton, M. D., of Washington, D. C. and Lauren H. Smith, M. D., of Philadelphia. Forty-nine members and nine guests were in attendance at this meeting. Baldwin L. Keyes, M. D., of Philadelphia, president of the Society, presided. The secretary-treasurer of the Society is LeRoy M. A. Maeder, M. D., Chancellor Hall, 206 South 13th Street, Philadelphia.

---

KEPNER METHOD OF COLLECTING SPUTUM FROM PSYCHOTIC PATIENTS.—Dr. Richard DeMonbrun Kepner, clinical director of the Territorial Hospital at Kaneohe, Oahu, Hawaii, reports a method of collecting sputum from non-cooperative mental patients, which he has used with satisfaction in his hospital for a number of years in his program for tuberculosis control and prevention. The method is simple and can be carried out readily by a nurse or attendant. Gowns and masks should be worn by those taking part in the procedure.

Dr. Kepner writes:

"The proper time for collection of sputum is the first thing in the morning before breakfast because it is well known that, at least in the early stages of tuberculosis, positive sputum is more likely to be obtained at that time than at any subsequent time during the day.

"The method of collection is as follows. The patient is seated on a chair or held in a sitting position on his bed. A sputum cup is placed in a convenient place. The person who is collecting the specimen stands on the right side of the patient (if the collector is right-handed). The patient's face is directed straight ahead while the collector places his left hand on top of the patient's head so as to keep it pointing in that direction. With his right hand, the collector inserts two tongue blades into the patient's mouth—*two* being used because one is more likely to bend or slip off the tongue. These two tongue blades are placed one on top of the other so as to form a depressor somewhat more sturdy and less flexible. The patient is told that the doctor wishes to examine his mouth and throat. The tongue blades are placed on the tongue just as if the throat were to be examined. The patient is asked to say 'Ah' and the doctor at the same time rapidly pushes them back so as to irritate the pharynx.

"The result is that the patient gags or coughs, or both. In nearly every case, the patient will give a rather vigorous cough which will bring up sputum if any be present. The patient is then bent forward and told to deposit the sputum in the container before he has a chance to swallow it. The operator and those assisting should remain well to the side during the whole procedure."

---

THE NEW WASHINGTONIAN HOSPITAL.—Located in the South End of Boston, Massachusetts, is the oldest institution in the country exclusively for the treatment and prevention of alcoholism, the Washingtonian Hospital. This unique institution was an outgrowth of the Washingtonian Movement, a temperance movement which, beginning in the city of Baltimore in 1840, swept with rapidity all over the country and attracted thousands of followers. In December 1840 such a temperance society was organized in Boston under the name of the "Parent Washingtonian Total Abstinence Society." This organization went a step farther in its purpose than pledge-signing and the holding of meetings in that it attempted to furnish immediate assistance to alcoholics.

In August 1857 a group of Boston men interested in the problem hired a suite of rooms for the temporary accommodation of inebriates and called it the "Home for the Fallen." This was the first Washingtonian hospital.

In 1859 the "Home" was incorporated and the name changed to the "Washingtonian Home" and in 1873 the present building at 41 Waltham Street was erected.

By 1938 the hospital had run down and gone to seed and a reorganization was begun under the leadership of Dr. Hilbert F. Day. Five eminent Boston psychiatrists, Drs. Leo Alexander, Wilfred Bloomberg, Robert Fleming, Abraham Myerson and Merrill Moore, were appointed to the staff and in 1939 the name of the institution was changed to the Washingtonian Hospital.

Today the Washingtonian Hospital is a modern hospital for the treatment of alcoholism on a scientific basis. Its staff, besides a medical superintendent, resident physician and nursing corps, embraces a visiting staff of twelve psychiatrists; consultants in surgery, dermatology, neurosurgery, ophthalmology, pathology and psychology; and an associate staff of thirty-seven. Psychometric testing and vocational guidance aid in the rehabilitation of its patients. An occupational

therapist gives instruction in manual hobbies, and a recreational therapist helps interest the men in healthful out-door exercise. A social worker investigates home and occupational conditions and assists in the readjustment of family and employer-employee relationships.

Modern medical opinion in regard to alcoholism has progressed considerably since the early days when "little else was found to be necessary for the treatment of inmates other than moral suasion, a sympathetic assurance of equality, confidence and brotherly love." Today alcoholism is considered to be a disease (or a symptom of a disease). This disease, so much neglected in the past, needs all the armamentarium of modern scientific medical knowledge brought to bear upon its problems: all the aid which drug and psychiatric therapy can marshal for its treatment and all the help a program of education can furnish to abet its prevention. Such a program of education is needed not only for the layman, but for physicians who have heretofore been neglectful of, or indifferent to, this unfortunate group of patients.

---

THE INSTITUTE OF CORRECTION, NORTH CAROLINA.—This institute, sponsored by the Commissioner of Paroles of North Carolina, was designed primarily as a training school for the parole staff, with the cooperation of the State Commissioner of Public Welfare, the State Board of Health, the Superintendent of Public Instruction, the Director of Prisons and the Director of Probation.

Meetings of the Institute were held at Raleigh, N. C., February 9-11, 1942. Among the speakers at the scientific sessions were:

James Watson, M. D., director of mental hygiene, State Board of Charities and Public Welfare, "Psychiatric Aspect of Misbehavior."

Hon. W. P. Stacy, Chief Justice, Supreme Court of North Carolina, "Our Changing Conception of Justice."

J. S. Bradway, professor of law, Duke University, "The Purpose of Criminal Justice."

John Gillin, professor of anthropology, Duke University, "An Anthropologist Looks at Crime."

William McGehee, professor of psychology, North Carolina State College, "Intelligence and Crime."

O. T. Binkley, professor of religion, Wake Forest College, "Religion in Relation to Crime."

Lee W. Brooks, professor of sociology, University of North Carolina, "Crime and the Community."

Francis Hiller, field director, National Probation Association, "Social Case Work in Probation and Parole."

James K. Hall, president, The American Psychiatric Association, "Of Ignorance and Cruelty."

Ernest R. Groves, professor of sociology, University of North Carolina, "The Family of the Offender."

William Allan, M. D., professor of medical genetics, School of Medicine, Wake Forest College, "Can We Measure our Inheritance?"

# BOOK REVIEWS

ORGANIZING AND MEMORIZING. By *George Katona.* (New York: Columbia University Press, 1940.)

The major purpose of the book is to present an investigation of the difference between learning by understanding and learning by memorizing and to show that learning by rote memorizing is not the prototype of learning. The author maintains that he has shown that learning by understanding differs from learning by memorizing in that in learning by understanding the rate of forgetting is much slower, and the transfer to new but similar problems is much greater.

The learning of a rote series of numbers or nonsense syllables illustrates almost pure memorizing, although the author points out that even in this process there is usually an organization of the material by some sort of rhythmic grouping into sets of two or three syllables each with the accent on the first or last number of each group. In learning by understanding, we find that "the essence of this type of learning is organization or reorganization of the given material by the learner." However, not all kinds of organization are sufficient; organization must be appropriate to the material if it is to yield understanding.

Again he states (page 203), "We have meaningful learning if the item fits naturally into the whole and if we understand the process of fitting in: then a structural trace of the process can be formed. We have senseless learning if the connection between the part and the whole is created artificially and the causes of the connection are not understood." This "structural trace" which is produced when learning by "understanding," is contrasted with the "individual trace" which is produced by "memorizing." Although distinguishing sharply between these two types of traces, the author regards them as extremes of a series. He points out (page 204) "that the various types of trace belong in one continuous series."

Despite the author's insistence that individual and structural traces are different and that the structural trace is not based on a set of over-learned individual traces, this reviewer remains puzzled as to the precise relationship between the two. The definitions and explanations are circular as illustrated above. We have learning by *understanding* if the "process of fitting in" is "understood," and by memorizing if "the causes of the connection are not understood."

The difference between structural and individual traces does not seem to depend on the learning method, for we find that in the case of the group taught by "helps" which led to understanding of the problem, there was one subject whose performance was far below average. For this case it is concluded that "Since the concept of traces is derived from observable effects—the form of recall or later performance—we must say that this subject had no structural trace of the principle of the match tasks" (page 197).

We are also told that "If we find individual traces effective in a specific way, a minimum of organization must have been present, because organization is a necessary condition for retention," (page 250); and "it appears that we can hardly retain individual items except as a consequence of a process of organization." (Two exceptions, the memory span and emotionally determined retention, are cited.) Just how this "appears" other than as a matter of definition is not explained.

The theoretical side of the book still remains unclear to the reviewer, partly because of the circularity of the explanations given as indicated above and partly because the illustrations of learning by understanding all required the utilization of considerable past knowledge on the part of the subject. For example, in the case of learning the series of numbers 5 8 1 2 1 5 1 9 2 1 the rule "add 3 then 4" which was discovered by some subjects will enable one to reconstruct the entire series *if he already knows how to add.* The illustrations of learning by understanding were all of the type such that the subject could reconstruct a *long* series or solve similar problems if he remembered a *short* rule of procedure. This necessitates the use of past knowledge, such as the rules of addition. The role of this past knowledge is not analyzed to determine its importance or the extent to which it *shortens the series* to be learned. It is simply maintained without proof, as far as this reviewer can see, that learning by understanding is not based on memorizing.

The most interesting part of the book is the experimental material. The characteristics which learning material must have to demonstrate the difference between learning by understanding and memorizing are stated as follows (page 32):

1. "Learning material should be chosen which can be learned in different ways, such as by mechanical repetition and by apprehending a principle.

2. "It should be possible to vary and to apply the learning material extensively.

3. "The learning material should present a novel situation."

Three types of material were chosen as meeting these requirements: match tricks, card tricks, and the learning of numbers. For the match or card tricks the subject was taught how to *solve* the problem when learning by understanding. When memorizing he was simply instructed as to the particular matches to move and where to move them; and for the card tricks he was given the correct order of the cards as a rote learning exercise. In the case of the numbers, he was simply to memorize

a series of numbers with no pattern in one case, while for learning by understanding the numbers were given a context, such as a table illustrating a principle which was explained in the text, or as a series of numbers with regular rules for the construction of the series.

The results cited at the beginning of the review were found in these experiments, namely that in learning by understanding there was less rapid forgetting and also more transfer to other similar problems. It was also found that memorizing was more efficient for immediate and rapid performance, e.g., the memorizers knew the order to put the cards in and did it very rapidly if tested immediately on the identical problem they had learned. Under these same conditions the persons who had learned by understanding, e.g., had learned *how to solve the problem* worked much more slowly because they had to solve the problem over again which took some time to do. But when given new problems of a similar sort, or when tested several weeks later the groups which had learned by "understanding" were superior to those which had "memorized."

There are some minor criticisms of the treatment of results. The number of cases for original learning is not the same as for recall, so that part of the change may be due to persons with good or bad scores dropping out. For a precise comparison, persons not taking the recall test should also be dropped from the original learning records. Large sample theory was used for analysis of small sample data. But these irregularities probably are not responsible for the results obtained.

This reviewer got the impression that the bias of the experimenter may well have affected the method of teaching so as to give "understanding" a better chance than "memorizing." For example, in the match trick one "senseless memorizing" method was to draw the problem and its solution on the board, to erase it, and draw it again. Such matters as timing and how long the experimenter moved completely from in front of the material, etc., are important.

An experiment was performed to demonstrate the failure of "mediate" association, e.g., a connection $a_1 - b_1$ was established; then the connection $b_1 - N_1$. The subject was then presented with a series of $a_1$'s and asked to name the first N that occurred to him; $N_1$ was not given in response to $a_1$. The author remarks, however, that "only with great precautions and careful concealment of the purpose of the experiment was it possible to achieve the results described" (page 174).

If "precautions" can reverse the results of the experiment, then the nature of these "precautions" is important. We should have a careful description of the conditions under which mediate associations are made and the conditions under which they are not made. No such careful description is given. What the experiment proves is that it is possible to avoid mediate associations.

The book is an interesting attempt to contrast two different methods of learning the same material and to test the effect of these methods on learning, transfer and forgetting. On the experimental side the results are convincing despite numerous opportunities for improving the technique of experimentation and analysis. On the theoretical side the definition of the contrast between the two methods needs to be more precise. One cannot both prove that learning by understanding improves retention and then point to a low retention score as evidence that the material was not understood. Finally, the extent to which understanding is dependent on well-learned individual traces, the extent to which it shortens the learning task by capitalizing on past experience, need to be more carefully investigated.

HAROLD GULLIKSEN, PH. D.,
University of Chicago.

L'ENFANT ET L'ADOLESCENT INSTABLES. (Etudes Cliniques et Psychologiques.) By *Jadwiga Abramson*. (Paris: Presses Universitaires de France, 1940.)

A comprehensive investigation of the intellectual, emotional and character disorders, and related problems is presented in this book of four parts. As an introduction to the subject, there is an historical review of the whole field with remarks on the contributions and contributors by Dr. G. Heuyer in the preface, and a more extensive survey of the German, French, English, American, Italian and Russian literature in the first part by the author. The first part also contains a description of the nature of the problem and outlines the four main general objectives which were followed in the study, namely, to ascertain as completely as possible the nature of the affectivity, the motility and the intelligence of unstable children; to study the individuals in both "longitudinal" and "transverse" sections of life histories; to attempt to evaluate the social conditions that appear to play important roles; and to compare the different types of abnormal children with normals.

Three different groups were investigated from clinical, social, educational and anthropometric angles: (1) primary or essential instability; (2) secondary instability with character disturbances; and (3) symptomatic group composed of somatic conditions, results of trauma and neuropathologic states.

Part 2 consists of the observations, condensed, but well presented, in the form of case sketches. Of the "primarily unstable" types, 33 cases of relatively pure psychomotor conditions are described. Character difficulties were not rare, so-called "stigmata of degeneration" were frequent, schizoid tendencies were noted, and "neuropathic and psychopathic" hereditary features were numerous, particularly among the epileptics. In addition to the above-mentioned cases, 8 others with instabilities were given in this group among which were illustrated many etiological and pathoplastic features. Of the type called "secondary instability," there were 36 cases described, including examples of severe emotional disorders, paranoid trends, "mythomanic-hysteric" reactions, perverse tendencies and epileptoid conditions. Of the "symptomatic" types,

there were 12 cases illustrating reactions encountered in heredo-syphilitic, choreic, postencephalitic and posttraumatic situations.

Part 3 is devoted to a presentation of the results of these case studies in terms of the intellectual, motor and emotional status of the abnormal children. The intellectual development levels are shown in charts which indicate the results of various clinical and experimental tests of the various types of disorders mentioned. Special intellectual aptitudes are shown by means of graphs, and there is an interesting discussion of verbal aptitudes, memory, attention, imagination and intuition. From these aspects "mental profiles" are formulated in a way that is interesting and valuable, but too extensive for a detailed review here. Studies on the emotional development include the stages of normal affective evolution which are compared with similar life phases in the abnormal. Among other phenomena, special attention has been given to the opposition to, or the revolt of, the child against environmental circumstances. This opposition may be "passive" in character as demonstrated in disobedience with sulkiness, or disobedience with stubbornness; or it may be "active" as shown in anger states, combative humor, and brutality; or it may be "aggressive" in the sense of attack on the environmental elements. Forms of deception, vagabondage, fugues, stealing and several varieties of erotic behavior are considered in detail with indications as to the combinations of events in the etiology.

Part 4 takes up the origin and development of instability. Heredity and signs of physical deficiency were found to be outstanding factors in a large number of the subjects. Characteristics of the preschool period, the school adjustments of the unstable, their later work adaptations, personal habits, subsequent careers and professional lives are all given special attention.

The book closes with a chapter on conditions of the ethnographic milieu. Familial and social elements, the factors of climate, race, sex, age and other pertinent information rounds out the investigation. The material is interestingly as well as systematically presented throughout, and summaries appear at the end of most of the chapters. It is a worthful addition to the books on child psychiatry.

N. D. C. L.

DIE UNEHELICHE MUTTERSCHAFT. (Illegitimate Pregnancy.) By *Hans Binder, M.D.* (Bern: Hans Huber, 1941.)

By chance selection, 350 cases of illegitimate pregnancy were studied most carefully from among the extensive material covering a period of 25 years of the municipal social agency of the city of Basle (Switzerland). An analysis of the factors which produce conflicts in the life of the illegitimate mother is presented under the groupings of life development of the woman until pregnancy, the period of pregnancy and the period after delivery. Personality disorders, especially feeblemindedness, are frequent among parents and siblings. Illegitimate pregnancy occurs frequently among the siblings. This is explained by hereditary and environmental factors. In childhood, discordant family life and lack of parental affection contribute. The oldest child is especially endangered. Because of unsuccessful scholastic records, the majority of the patients were poorly prepared, and most of them became unskilled laborers and servants. Many break away from home early. They are insecure, often living in increasingly lower socio-economic conditions. One-third were considered normal, $\frac{1}{6}$ oligophrenic, and $\frac{1}{2}$ psychopathic. Only half were found to have normal ethical standards.

Most of the illegitimate fathers belonged to the lowest social strata and had inferior ethical standards. Sexual relationships were started after short acquaintance. One-third of the women were under 20 years of age, and more than half had never loved their sexual partners. This fact explains that the majority of these relationships were terminated during the pregnancy, and that these mothers accepted pregnancy passively. During the first five months of pregnancy, they hated the child. During the last few months and immediately after delivery, they developed affection for the child, which, however, decreased afterwards (only $\frac{1}{3}$ loving the child later). The mother-child relationship is obviously aggravated by the unfortunate social reaction of our civilization which may lead to serious conflicts. The results are permanent estrangement from their families ($\frac{1}{2}$), and social decline ($\frac{1}{8}$). Some of the mothers have no further heterosexual relations ($\frac{1}{10}$), while others end in prostitution ($\frac{1}{10}$). A considerable number later marry men of inferior standing or personality, producing marriages full of conflict. Better situations result in marriages which were undertaken between the father and mother to make the child legitimate. The most satisfactory results are obtained where the mother and child can live with relatives.

Half of the mothers react psychopathologically, $\frac{1}{3}$ of them resulting in serious neurotic and personality reactions. Paranoic reactions are not rare, especially among the feebleminded group. In severe oligophrenic and psychopathic reactions, interruption of the pregnancy, accompanied by sterilization in many cases, is indicated.

In evaluating the indications for abortion, emphasis must be placed on the severity of psychological conflict as well as on the personality before pregnancy. (The author opposes abortion when conflicts that are not unusually severe have resulted in fairly well-adjusted individuals, or when the mother was psychopathic before pregnancy.) Chronic psychotic reactions occur rarely and are an indication for abortion only when previous pregnancies were accompanied by psychotic reactions or when psychogenic factors have caused previous affective psychoses or in early pregnancy.

The sterilization of carefully selected feebleminded and psychopathic individuals is proposed for the prevention of serious personality disorders. Sterilization should be combined with the strengthening of the family ties, better sexual instruction,

opportunities for sports and work, and better organized social and legal assistance for these mothers. The reviewer gives the content in detail to offer the non-German reader an understanding of the most important psychological, psychopathological and sociological facts which are presented clearly, and are discussed critically and constructively. The material found in this book has not been presented by any other author and is valuable to the practitioner and the investigator.

Oskar Diethelm, M. D.,
Payne Whitney Psychiatric Clinic,
New York Hospital, New York.

The Medical Aspects of Boxing. By *E. Jokl, M. D.*, (Pretoria, South Africa: J. L. Van Schaik Ltd., 1941.)

Dr. Jokl, who is the head of the department of physical education of Witwatersrand Technical College, Johannesburg, South Africa, has gathered together some interesting material from a great many sources, both medical and non-medical, in his consideration of the medical sequelæ of boxing.

The book should be useful to physicians who are professionally associated with those who practice the manly art of fisticuffs, whether in college or in the professional arena.

Interestingly enough, a poll of athletic directors shows a great many opposed to amateur boxing, as more than 50 per cent were opposed to intercollegiate boxing and in Dr. Jokl's opinion "it appears that it is only the intense interest of the students themselves which keeps boxing alive in many educational institutions. The athletic directors who still favor boxing will certainly change their attitude as soon as they become aware of the danger to health connected with boxing."

C. C. Burlingame, M. D.,
Neuro-Psychiatric Institute of the
Hartford Retreat, Hartford, Conn.

An Annotated Bibliography of Mental Tests and Scales. Volume II. By *Charles K. A. Wang, Ph. D.* (Peiping, China: Catholic University Press, 1940.)

This second volume was published within one year of Volume I, and is a continuation of that work. It is termed Part 4, and is a bibliography including "all tests and other devices which would ordinarily be regarded as belonging or related to the field of educational measurement." Volume I covers a broader field in mental tests, having included means of measuring: 1. Mental Capacity; 2. Personality and Character; 3. Vocational Aptitudes and Abilities. It was ably reviewed by C. R. Myers, Ph. D., in The American Journal of Psychiatry, January 1941.

In publishing this work Dr. Wang has placed at the disposal of educators and psychologists an exhaustive and yet condensed guide to tests in educational measurement. This bibliography is well classified and includes chapters on the following: (1) Composite Tests and Test Batteries; (2) Arithmetic; (3) English; (4) Fine Arts; (5) Foreign Languages; (6) Handwriting; (7) Mental Hygiene; (8) Home Economics; (9) Mathematics; (10) Science; (11) Psychology and Education; (12) Reading; (13) Social Science; (14) Spelling. There is also an index of authors and subjects. Many of these chapters are sub-divided with the result that it is a ready reference. As in the first volume each test is annotated giving name of test, name of author, date of publication, price, type of subject for which test is intended, including age and grade. Tests range from the kindergarten to the college graduate level.

In an attempt to do justice to the work one might comment on one topic, "Reading," chapter 12, pages 416-482. This chapter includes a descriptive practical note on 219 reading tests. Since reading disabilities are among the problems occurring in children who are referred to child guidance clinics, this review is invaluable to clinical psychologists, in the selection of practical tests. These include diagnostic, remedial, word-recognition and word-pronunciation tests which are applicable in this field. On the other hand, innumerable resources are to be found in silent and oral reading and achievement tests, of assistance to teachers and educators for school placement. These range from elementary to advanced grades.

This volume is invaluable as a constant reference to educators and clinical psychologists interested in the field of educational measurement.

A. Jean Brown, M. A.,
Toronto Psychiatric Hospital,
Toronto, Ont.

Personality and Life. A Practical Guide to Personality Improvement. By *Louis P. Thorpe.* (Toronto: Longmans, Green & Co., 1941.)

In the introductory statement the author says that this book is not addressed to scholars but to intelligent persons who are interested in personality as it affects the everyday conduct of life. It is also suggested that it might well be used as a second semester text on personality development to follow the introductory course in general psychology. The reviewer is unable to recommend it for either of these groups.

The book is naïve and superficial. Psychoanalysis is described as follows: "This doctrine is practically a modern substitute for instinct psychology and the older doctrine of original sin." In the discussion of girls' sex problems "a girl is therefore safe in petting only to the extent that her affections are involved, and then only to such a degree that she is sure of remaining always in control of her emotions." Apparently only introverts become neurotics —"Self-interest and lack of attractive social habits have forced them into introversion and neurosis." "Yet psychology has some things to offer man and his society. Its suggestions, simple though they may seem, touch the very heart of human adjustment. Psychology's message is that people should learn to live more actively and socially, that they should acquire the skills which make for acceptance by others, and that they endeavor to make constant

contributions, no matter how small, to the construction causes for which an orderly and enlightened society is always striving."

CHARLES R. ATWELL, M. D.,
Boston Psychopathic Hospital,
Boston, Mass.

SYMPOSIUM ON MORALE. (Chicago: American Journal of Sociology, Nov. 1941.)

This number of the Journal is of especial interest to psychiatrists by reason of being devoted entirely to aspects of the problem of morale.

The leading article, "Psychiatric Aspects of Morale," by Dr. Harry Stack Sullivan, discusses first the various grades of personal demoralization, and proceeds to the problem of demoralization of the group, and the influence of physical (noise, starvation, etc.), as well as psychological factors in its development. Dr. Sullivan then proceeds to develop the elements of a "protective counter-strategy." These he summarizes as: (1) dissemination of understanding of the social structure necessary in the nation at defensive war; (2) the synthesis of solidarity; (3) the control of disintegrative people; (4) realistic distribution of roles; (5) and the hygienic management of activity. Finally, he makes an urgent plea for the development of true leadership.

Prof. William Ernest Hocking of Harvard presents an article on "The Nature of Morale." "Morale," he says, "is a democratic element in a group structure. . . . . The question is never one of obedience alone—you can get that from an animal—but how much of a man obeys." Brig. Gen. James A. Ulio, until recently head of the Morale Branch of the Army, writes on "Military Morale," and Dean Landis, now associated with the Office of Civilian Defense, writes on "Morale and Civilian Defense." George Creel presents a significant discussion of "Propaganda and Morale." He points out the close relation of civilian to military morale. Citing Tom Paine to prove his point, he maintains that "propagandists do not have to lie, do not have to preach hate, do not have to corrupt, and no not have to fall victims to megalomania and national egotism. It calls for a minimum of censorship and presents the necessity of letting the people 'know exactly what it is that they are fighting for.'" Finally, he says, the public must look beyond the war to the peace; ideals are essential.

In all, there are 17 articles, some of the others being by such prominent men as James R. Angell, Robert E. Park, Edward C. Lindeman, Edward Scribner Ames, Henry Durant, and Pierre Cot—such subjects are discussed as radio, motion pictures, recreation, religion, minority groups, journalism and the state of morale in France, Germany and England.

The entire number is exceptional, and should be read carefully by everyone interested in this most important topic.

WINFRED OVERHOLSER, M. D.,
Saint Elizabeth's Hospital,
Washington, D. C.

CRIMINAL YOUTH AND THE BORSTAL SYSTEM. By *William Healy, M. D.*, and *Benedict S. Alper.* (New York: The Commonwealth Fund, 1941.)

This short and easily read book has a background and a foreground. The background is the rising incidence of crime in the youth of the United States and the recognized and deplorable fact that in the United States there is no intelligent way of dealing with this serious issue. The authors give examples of the different kinds of youthful offenders and the lack of coordinated aim in court and correctional treatment in this country. The net result of our "reformatories" is that there is no reform.

The foreground is the Borstal System of England before the war, a coordinated method by which court and eleven institutions and parole work together to bring individualized training to boys from sixteen to twenty-one. Some institutions are closed, some open. House-masters and other superior personnel under civil service are essential. The whole set-up is intelligent and wholesome. Its weaknesses seem to be lack of enough psychiatric diagnosis and treatment, lack of interest in the family situations from which boys come, and its four year maximum term. But it gets good results.

The youth Correction Authority, sponsored by the American Law Institute is recommended as a first step in the United States toward the good features of the Borstal System.

EARL D. BOND, M. D.,
University of Pennsylvania.

BORN THAT WAY. By *Earl R. Carlson, M. D.* (New York: John Day Co. Inc., 1941.)

This is Dr. Earl R. Carlson's life history. He was born with birth injuries which "made me a victim of spastic and athetoid paralysis." He went through college and attended medical school where he got his doctor's degree. He acquired numberless friends and knew, admittedly, from childhood on how to utilize his shortcomings. In the book it is reported that he is now running his own clinics for fellow sufferers, is married and happy. His achievement is commendable, although it is not clear how much of it is due to his own accomplishment and how much to the indulgence of his friends, associates and teachers. The book is writen for laymen who will be startled by all the medical-technical terms, and perhaps also a little by Dr. Carlson's considerable self-complacency. Nevertheless, it may give comfort and hope to quite a few handicapped patients.

EUGEN KAHN, M. D.,
Yale University.

TRAINING AND EFFICIENCY: AN EXPERIMENT IN PHYSICAL AND ECONOMIC REHABILITATION. By *Jokl Cluver Goedvolk De Jongh.* (Johannesburg, South Africa: South African Institute for Medical Research, 1941.)

Amongst the multitude of gloomy predictions of national decay in the various democracies touched by the war, it is heartening to read one such report as this from South Africa in which the author, in-

stead of bemoaning the deficiencies of his fellow citizens, has undertaken to show what can be done even with apparently unfavorable stock by properly supervised training. His material was a representative group of 32 underprivileged, poorly educated and underfed youths between 16 and 21 years of age from the Special Service Battalion which seems to be an approximate, though more military, South African equivalent of the Civilian Conservation Corps of the United States. Such readily measurable entities as height, weight, chest expansion, respiratory rate, vital capacity, pulse rate, blood pressure, and the times necessary to do standard tasks such as running one hundred yards or three miles, repeatedly checked during the eighteen month training period, have been carefully tabulated, graphically recorded and statistically evaluated. Highly technical and unemotionally presented, this is hardly a book for the general reader—in fact it is hardly a book at all in the ordinary sense of the word, since the reading matter is small indeed in comparison with the numerous tables and charts which comprise by far the greater part of the printed matter. How far the specific data obtained are applicable to other programmes may be a moot question, but the author's effort to be specific and concrete, is as highly commendable as his optimism and the broad vision of his ambitious project, of which incidentally the present volume is only one part. He will survey: (1) The resources at hand, (2) The physical results of training, (3) The educational results, and, (4) The administrative steps necessary to bring all these together "into well constructed channels of a coordinated labor effort."

LESLIE R. ANGUS, M. D.,
Neuro-Psychiatric Institute of the
Hartford Retreat, Hartford, Conn.

THE RELATIVITY OF REALITY. By *Rene Laforgue*. (New York: Nervous and Mental Disease Publishing Company. 1940.)

This psychoanalytical monograph is a succinct and valuable contribution to the psychology of the ego of the individual and the group. The author gives as the practical aim of the book, an outline of "differences in the orientation of the intellect," differences which must have obvious social consequences. The intellect is described as "the sum total of aptitudes which the ego utilizes in seeking to face reality with a scientific approach." The type of conception of reality made by an individual or group varies with the dominant stage of development of its ego; and it is a consideration of the intellects characteristic of various stages of development of the ego and the resulting types of conception of reality with which this book is concerned. Hence there are many realities. Individuals or groups see any one of these in the same way only insofar as there has been a similar affective development in the ego.

In the last analysis the author sees each concept and complex of perceptions as a defense mechanism of the ego against anxiety. He begins with a summary of the Freudian view of anxiety and the normal and pathological forms of reaction of the ego to anxiety. The pathological forms include the symptom, the character-trait, and scotomatization or abnormal and incomplete repression in which intelligence may be used. Insofar as these are present, they lend their own influence to the individual's perception of reality. Then follows an outline of the development of the libido with special attention to the situations where man must normally face anxiety in the course of his development and to the instances where anxiety is likely to be increased in an unusual way. Among these instances are mentioned a defect in the hereditary super-ego, a neurotic parental super-ego, and accidental traumata.

In the theme chapter of the book Dr. Laforgue discusses the development of the ego, which is seen to parallel that of the libido which can be utilized by it. He points out the normal way in which the ego disposes of anxiety as well as the pathological means of which it may have to avail itself. One is led to an evaluation of the influence of anxiety on the development of the intelligence of the individual and group.

The well-marked historical phases of the ego, as of the libido, are the oral, anal, and genital, with numerous transitional stages especially between the anal and genital. The author describes comprehensively, except in the treatment of the oral phase, the mode of knowledge, type of conception, intellect and character of the individual according to the dominance of these phases and intermediary stages. At the anal stage the ego deals with magic reality; the mode of knowledge is projection in which all things are seen as like the self, and the type of conception is an animistic one. This is succeeded by transitional stages in which the need for causality appears as the result of libidinal development and the need to perceive sexual relations between the parents, reflected as the necessity to perceive true relations between things. The ego meets the resulting fear of castration by an exalted love for the parent of the same sex. At this stage the ego deals with religious reality and, according to the author, conceptions at first polytheistic and later monotheistic. It has begun to deal with scientific reality and the scientific conception of the universe which characterizes the genital stage. This type of reality is realized only when the ego has identified itself with the father and is free from the sense of guilt arising from the destruction of the father in the super-ego. "Scientific thinking is distinguished from religious thinking in this, that the ego seeks to act directly, without the aid of God, upon the cause of danger by rational knowledge of its nature." "It must be that the ego makes slow progress in learning to live without paternal support; very gradually does scientific thought replace religious thought, and never entirely so." "Where do we stand today? Scientific thought has led us to the concept of relativity in regard to what had formerly appeared to be absolute. . . . . We have ourselves added to this notion that of the relativity of reason, of truth or logic, of science, namely of all concepts found to be of value to man, in ways economic as well as political and social."

The anal intellect, with its variants, under whose leadership our civilization is seen so largely to be, is considered in detail, as also is the anal intellect with a genital component. In the latter category belong intuitive and feminine intellects. There is a delineation of the genital intellect with comment on its greater adequacy and on the implications as to where mankind is headed in the evolution of his conceptions and thought. The oral intellect and character and the personality in which this component looms large are given scant attention aside from their significance in pathological mental states. It is to be regretted that further elaboration of this aspect of the thesis was not made, in view of the part played by cyclothymic personalities in the work of our civilization.

The author's conclusions are:

(1) "The ego of individuals proceeds with an eminently variable amount and quality of libido, depending on the amount of genital, anal and oral libido available.

(2) "The conception of reality depends upon the predominance of one or another of these forms or qualities of the libido utilized by the ego. In other words, we have tried to demonstrate the connection between the intellectual and the affective development of the individual by pointing out the link whereby the former proceeds from the latter." "It follows that no logic nor reasoning on earth could possibly bring divergent types to agree on points of disagreement."

In the final chapter the writer gives his ruminations on the notions of free will, liberty and death. The existence of free will, liberty of action and immortality are indispensible to the religious intellect and even more so to the animistic one. Only as the scientific intellect emerges, are the notions of free will and liberty relinquished and that of death accepted.

The brevity and nature of the work preclude the use of much clinical material. The author draws upon all sources of knowledge and his own analytical experience and reflections. Highly complex subject matter is simplified and the theme presented clearly and concisely from the psychoanalytical approach.

H. JACKSON DESHON, M. D.,
Boston Psychopathic Hospital,
Boston, Mass.

SOCIAL LEARNING AND IMITATION. By *Neal E. Miller* and *John Dollard*. (New Haven, Conn.: Yale University Press. 1941.)

The primary thesis of this book consists of an attempt to demonstrate by means of theoretical analysis and objective experiment that imitation is a learned phenomenon. The learning theory espoused by the authors is a modernized form of the "law of effect." They maintain that only acts which are followed by a reward are learned, and for them, rewards are ". . . . events producing reductions in the strength of the drive stimulus . . . ." (29)

In the first five chapters the authors lay the groundwork for their argument by describing and illustrating their theory of learning and by showing how it relates to the higher mental processes involved in language, foresight and reasoning.

In chapters 6 through 13 they demonstrate the learned nature of imitation; first deducing it and then reporting experimental studies on rats and children substantiating their deductions. Besides showing that both rats and humans can learn to imitate acts performed by other members of the same species, and that this tendency to imitate generalizes from one situation to another, their experiments also confirm their deductions concerning the prestige of leaders. They find that children can learn to copy a leader if they are rewarded for copying and to "non-copy" a different leader if such behavior is made profitable. Furthermore, this learning generalizes to new leaders who resemble their former models and to new responses previously unpracticed. In addition to these results, Miller and Dollard report an experiment carried out to cast light upon the relation between imitation and independent learning.

Chapter 12 deals with an analysis of the social conditions outside the laboratory which produce imitation. The authors point out that there are at least four classes of persons who are imitated by others. These are ". . . . (1) superiors in an age-grade hierarchy, (2) superiors in a hierarchy of social status, (3) superiors in an intelligence ranking system, and (4) superior technicians in any field." (183) Each of these groups is discussed in some detail and it is suggested that these people are imitated because we have learned that through copying their behavior we can often achieve coveted goals.

Chapters 14 and 15 are entitled "Crowd Behavior" and "Analysis of a Lynching" respectively, and are included to round out the discussion and to bring it to bear upon significant social phenomena. These chapters, however, draw very little from the material which goes before and though worthwhile reading they are almost irrelevant to the main thesis of the book.

The final chapter consists of a stimulating discussion of cultural diffusion viewed from a psychological vantage point. The book is concluded with a fifty-two page appendix which contains a revision of E. B. Holt's circular reflex theory of imitation and a classified history of the theories of imitation.

Though none of the deductions or experimental results presented in this treatise is startling, nevertheless, the experiments are conclusive and the analysis is both careful and thorough. However, to one already acquainted with psychological literature, the authors' proclivity to belabor commonly accepted ideas may prove to be somewhat annoying. Furthermore, such a reader may deplore the attempt of the writers to discuss their material on an undergraduate level for it is undoubtedly this which has made the book unnecessarily repetitious and prolix.

Aside from these possible drawbacks, however, the book possesses considerable value as an example of capable scientific analysis and experiment. Those who favor a psychological treatment of psychologi-

cal facts instead of an interpretation in terms of sociology will commend the authors for their soundness, while those who prefer "frames of reference" to "reflex circles" will at least be forced to admit that Miller and Dollard have made a definite contribution toward a knowledge of human relations.

F. V. TAYLOR, PH. D.,
Princeton University.

FOUR TREATISES OF THEOPHRASTUS VON HOHENHEIM CALLED PARACELSUS. Translated from the original German by *C. Lilian Temkin, George Rosen, Gregory Zilboorg, Henry E. Sigerist.* Edited with a preface by *Henry E. Sigerist.* (Baltimore: The Johns Hopkins Press. 1941.)

This volume, one of the publications of the Institute of the History of Medicine of the Johns Hopkins University is a notable contribution to medical annals. It is published in commemoration of the four hundredth anniversary of the death of Paracelsus.

The four treatises, by the translators in order as above indicated, are: I. *Seven Defensiones, the Reply to Certain Calumniations of His Enemies;* II. *On the Miners' Sickness and Other Miners' Diseases;* III. *The Diseases That Deprive Man of His Reason, Such as St. Vitus' Dance, Falling Sickness, Melancholy and Insanity, and Their Correct Treatment;* IV. *A Book on Nymphs, Sylphs, Pygmies and Salamanders, and on the Other Spirits.*

Each treatise is preceded by an introductory essay by the translator which outlines the substance of the treatise, orients it in the Paracelsian system and relates it to the thought of his time. These four introductory essays by themselves revivify and illuminate the personality of Paracelsus and reveal the lengthening shadow he cast across the sixteenth century and beyond.

The *Seven Defensiones* "is probably Paracelsus' most personal work. It is a passionate justification of his character, activities and views, and gives a splendid picture of the man and of his basic ideas."

The treatise *On the Miners' Sickness* "is the first monograph ever written on the diseases of an occupational group. . . . . The book became the starting point of a new line of medical literature."

The treatise on *The Diseases That Deprive Man of His Reason* "is the most important document on the psychology and psychiatry of Paracelsus. Written at a time when mental diseases were again to be studied and treated by physicians, it is a pioneering book also, and anticipates modern views."

Regarding *A Book on Nymphs* the translator, Dr. Sigerist, says: "I became interested in it, years ago, in the course of studies on the survival of paganism in Christianity, and I was soon fascinated by its poetical character. . . . . I studied Paracelsus' treatise primarily from the point of view of comparative literature and art, but I found that it is also a good sample of his philosophy and theology."

In presenting the volume at this time the Editor expressed the desire "to contribute our share in reviving the personality of an honest man who was a great physician and a staunch fighter for what he considered the truth. It is so easy to be orthodox and to reap honors by repeating what people expect and wish to hear. Progress, however, is achieved through the clash of ideas, and heretics like Paracelsus are a ferment without which there would be no life."

The works of and about Paracelsus are indicated in a brief bibliography at the end of the book.

C. B. F.